CA-IR-181

Ref: CA-IR-5, page 7 HECO Annual Report (Energy Management System).

According to the Annual Report, "Most notable in 2006 was the completion of a new $27 million HECO Dispatch Center on Oahu, home to a new Energy Management System that helps ensure that system demand is met with optimum efficiency." Please provide the following information:

a. A complete copy of the economic analyses prepared by or for HECO to justify its investment in the Dispatch Center and EMS system.

b. A summary of the test period investment and expense impacts of the Dispatch Center and EMS, by NARUC Account.

c. Calculations indicating whether or not the expected economic benefits of the investment in the Dispatch Center and the EMS are fully reflected in the test year, based upon the values summarized in your response to part b. of this information request.

HECO Response:

a. The commitment of expenditures for the Dispatch Center and Energy Management System project were reviewed and approved by the Commission in Docket No. 03-0360. In HECO's PUC Application filed on October 2, 2003 in Docket No. 03-0360, "Item Y00030, New Dispatch Center (which includes a new Energy Management System), HECO explained the need for the New Dispatch Center and the new Energy Management System and noted that the New Dispatch Center and the Energy Management System ("EMS") are critical elements for monitoring and controlling the electrical system and are critical for the dispatcher's response to events on the electrical system. The justification for this project was not based on economic analyses but was instead based on the critical operational requirements that these projects fulfilled. In addition to the application, key information and pleadings filed in the proceeding (in which the Consumer Advocate was a party) included:

1. HECO letter filed October 3, 2003 transmitting voluminous studies:

a. 1996 Study by MACRO Consulting and Robert E. Lamb, "System Operation Dispatch Center Study"

b. 2003 Study by KEMA Consulting, Inc., "EMS Revitalization Project Study"

c. 2003 Study by Robert E. Lamb, Inc., "Facility Planning Study"

2. HECO letter filed December 9, 2003 transmitting detailed cost estimate submitted pursuant to Protective Order No. 20610, filed October 29, 2003.
3. HECO responses filed December 12, 2003 to Consumer Advocate first set of IRs.
4. HECO responses filed January 20, 2004 to Consumer Advocate's second set of IRs, including confidential cost estimate information submitted pursuant to Protective Order No. 20610.
5. HECO voluminous responses filed January 21, 2004 to Consumer Advocate's second set of IRs.
6. HECO responses filed January 30, 2004 to Consumer Advocate's informal IRs.
7. HECO letter filed May 13, 2004 transmitting RFQ's for the Dispatch Center Building and the EMS Replacement, including bid specifications submitted pursuant to Protective Order No. 20610.
8. Joint HECO/Consumer Advocate letter filed June 18, 2004 documenting agreements regarding Consumer Advocate's recommended conditions.
9. Decision and Order No. 21224, filed August 6, 2004.
10. HECO Interim Supplemental Report filed April 18, 2005 providing bid information for the Dispatch Center Building and the EMS Replacement, including bid information submitted pursuant to Protective Order No. 20610.

Copies of these documents, which should already be on file with the Consumer Advocate, will be provided upon request. Persons provided access to the information designated confidential will

need to execute a Protective Agreement pursuant to Protective Order No. 20610 in Docket No. 03-0360.

The following summarizes information provided in the Application regarding the project:

Dispatch Center Evaluation

In 1996 HECO commissioned MACRO Consulting and Robert E. Lamb to develop a study to evaluate the existing EMS and the existing Dispatch Center facility. MACRO Consulting focused on HECO's old EMS while Robert E. Lamb being an architectural consulting firm focused on the dispatch center. Their findings were reported to HECO in the 1996, "System Operation Dispatch Center Study". The results from the 1996 EMS Study relative to the dispatch center was that the existing Dispatch Center exhibited many shortcomings, such as obstructed views of the wallboard, compromised area access security, and a lack of space to accommodate new dispatch computer systems.[1]

In the 2002 to 2003 time period, Robert E. Lamb was commissioned to update the 1996 MACRO Consulting report and this resulted in the 2003, "Facility Planning Study". The 2003 study found that the then current operating area in the Ward Avenue building was unsuitable for continued use as the dispatch operations center. There were two primary issues related to the physical plant of the Dispatch Center: (1) the security issues with respect to the physical location of the Dispatch Center in the Ward Avenue Building, and (2) the lack of functionality of the current Dispatch Center. The issues with the old dispatch center identified in the 2003 Lamb report are the following:

- The Dispatch Center is overcrowded and lacks functionality that is very common in other utility dispatch offices.

[1] While the 1996 EMS Study noted that HECO staff had adapted to the situation, the Study recommended that the Dispatch Center be brought to modern standards through the installation of a new EMS and construction of a new Dispatch Center.

- Operators have a limited line of sight to the static map boards.[2]
- Operators depend on magnetic markers and typed and hand-written notes affixed to the static map boards,[3] which is inefficient.
- Operating information is difficult to share.
- Static map boards have limited capability.
- The Dispatch Center is located close to high personnel traffic.
- The Dispatch Center is congested due to limited space.
- There are high noise levels due to limited space in the center.
- The ceiling height is relatively low as compared to industry dispatch centers.[4]

Additionally Robert E. Lamb noted that following the September 11, 2001 terrorist attack, various government and military agencies inspected HECO's facilities for several days. HECO was subsequently informed that the Ward Avenue facility was a critical site and was designated to be one of a very small number of mission essential vulnerability asset ("MEVA") sites on Oahu. The significance of the MEVA designation for the Ward Avenue site is that if there is any indication of a credible threat of a terrorist incident directed toward Oahu, action will be taken by the police and the military to protect the MEVA sites. The 2003 Lamb Report also noted that the Dispatch Center is close to high personnel traffic areas and from a security aspect, visitors to the premises may be potential threats to the Dispatch Center operations. Finally, the Dispatch Center, currently located at HECO's Ward Avenue property, is in close proximity to a highly traveled roadway (Ward Avenue). It is evident that even with unsophisticated technology, severe damage

[2] The limited line of sight to the display boards impacts the amount of information that the dispatchers can see relative to the system configuration. Improving the line of sight so that the dispatcher can see the entire map board or display board allows dispatchers to remain at their EMS consoles (as opposed to walking around to see the bottom of the map board) and view the system configuration while continuing to monitor the EMS displays.

[3] While the magnetic pins and hand-written notes on the map boards are necessary for the dispatchers to know the system configuration, the use of the magnetic pins and sticky notes should be replaced with modern technology. Conditions in the Control Room can get so crowded, especially during emergencies, that it is easy for someone to brush up against the map board and accidentally remove a magnetic pin or sticky note thereby creating an unsafe condition. HECO personnel are well aware of this situation and take great care around the map board. Nevertheless, this condition can be alleviated with the installation of the dynamic display projection boards.

[4] The static map boards should be raised above the height of the dispatchers' consoles in order for the dispatchers to view the entire map board as well as the EMS monitors on the display console. In HECO's current Control Room, the ceiling height is too low to allow the map boards to be elevated above the display consoles.

could be inflicted onto HECO's Ward Avenue building, such as by a truck running into the side of the building and essentially knocking out the entire Dispatch Center operations.

The 2003 Lamb Report noted that very little can be done to alleviate these concerns in the current space as HECO has utilized the available space within the first floor of the existing building. Moreover, the existing Control Room is inadequate for the associated improvements in equipment related to the EMS, such as the new Dynamic Display Boards, due to the low height of the ceiling and other space limitations in the existing Control Room. The 2003 Lamb Report recommends building a new Dispatch Center to address these concerns and improve the security of the Dispatch Center against a potential terrorist attack or vandalism by moving it further from Ward Avenue.

The Energy Management System Evaluation

In September of 1996, HECO engaged Macro Corporation and Robert E. Lamb, Inc. ("Lamb") to comprehensively evaluate the existing EMS and determine the requirements for an upgrade and/or replacement if necessary. Macro Corporation focused on the EMS analysis for the 1996 report. The 1996 EMS Study stated that the existing EMS is clearly at the end of its life. The withdrawal of the EMS supplier, Rockwell, from the EMS marketplace prior to the end of the life of the system left the maintenance of the system completely in the hands of HECO. The 1996 EMS Study found that the EMS has remained in productive use beyond its designed lifetime due entirely to the efforts of HECO's EMS support staff. The 1996 EMS Study recognized that the current levels of power system reliability and economy cannot be maintained without a functioning EMS, and recommended replacing the EMS to maintain system reliability and economy. The study made no quantitative claims for increased reliability or economy or for reduced restoration times. The recommendation was solely based on maintaining the 1996

measures of performance. The 1996 EMS Study did, however, point out that the new EMS would include better tools for the dispatchers to predict, prepare for and manage emergency conditions.

A project to replace the then current EMS was initiated in 2001 and, in 2002, HECO commissioned KEMA Consulting (formerly Macro Corporation) and Lamb to update the 1996 EMS Study. The results of the update are in the EMS Revitalization Project Study of April 2003 ("EMS 2003 Study") and the Facility Planning Study Report for Hawaiian Electric Company New Dispatch Center of August 2003 ("2003 Lamb Report").

The EMS 2003 Study found that HECO has been able to maximize its utilization from the existing EMS. However, the study also stated that the then-current EMS was obsolete, had reliability that was less than desired, and was missing needed functionality. The study pointed out that the piece-meal upgrade of the EMS was problematic. HECO's resources, because of the constraints and impacts of dealing with a "real-time" system, could only work on portions of the EMS at any time[5]. While this development work was done, HECO's resources had to continue to be used to maintain the functionality of the current system. Integrating the changes for the piece-meal upgrades of the existing EMS could result in unexpected consequences since it is difficult to test the software modifications without compromising the real-time system. As a result, the consultant could not recommend that HECO continue the practice of piece-meal upgrades of the existing EMS. Moreover, the studies also pointed out a number of other shortcomings of the existing EMS, including:

- Obsolete hardware will be a continuing problem.

[5] With a "real time" computer system, program modifications that are implemented will impact the operation of the computer system as it monitors and responds to events as they occur on the system. Because of this exposure, HECO's staff is careful when implementing changes to the EMS because of the potential impact to the operation of the system.

- Scan rates are slower than industry norms.[6]
- Channel capacity limitations.[7]
- RTU communications interfaces are obsolete.[8]
- Occasional unexplained lock-ups occur.
- Semi-proprietary protocol creates limitations.
- User interface hardware is obsolete.
- Character graphic user interface display is limited.
- Data storage and dissemination capability is limited.
- Real-time analysis capabilities is limited.[9]

In addition to the shortcomings related to the operation of the existing EMS software, the following are issues related to the continued support of the existing EMS by internal resources:

- The necessary commitment of HECO resources cannot be supported at the current staffing levels and skill sets.
- The existing EMS will continue to be a one-of-a-kind system. HECO alone will bear responsibility for maintenance and future upgrades.
- Maintenance over the long-term will depend on HECO's ability to retain the knowledge of all upgrades. (None of the staff participating in the previous upgrade projects remain with HECO today.)
- The system cannot be upgraded as a single entity; upgrades will be piecemeal. The coordination of upgrades across the individual elements of the EMS will prove problematic. The support staff must maintain the interfaces among the system elements as well as the functions themselves.
- The existing EMS lacks true integration of functionality. The user interfaces of the functions will be different and potentially confusing.
- The lack of integration will also complicate interface to other computer systems, particularly the planned Outage Management System.

---

[6] Scan rates reflect the periodic time interval at which the data on the system is collected. On the electrical system changes can occur in fractions of a second. It would be technically and economically unfeasible to try and capture data at millisecond resolution. The industry norm is for data to be collected between 1 and 4 seconds. HECO's scan rate is presently at 8 seconds.

[7] Channel capacity refers to the number of remote terminal units (RTU's) that the EMS can communicate with. Though the EMS was designed to handle 96 communication channels, the degradation of the existing EMS has limited channel capacity to 43 channels to preserve the current scan rates. More channels may be used if required, however, the impact will be slower scan rates.

[8] The RTU communication interface is the message format that is used to exchange commands or data between the field devices and the EMS. Having the ability to support other message formats or protocols would provide more flexibility in the types of RTU's that can be used and improve the capabilities of the system, e.g., communication directly with the Distributed Control System at the generating plants to dispatch the units.

[9] The lack of real-time analysis capabilities pertains to the tools that can be used to prepare for emergencies. In modern systems, simulations can be run automatically for the "next" outage, i.e., losing another component on the electrical system so that the dispatchers can prepare for the next worse case scenario. The information that they get from the simulations helps them prepare for that emergency.

- The existing system life is stretched beyond today's standards for system life. This delay on replacement does not allow for the introduction of new functionality found in current systems.
- The technical risk of continuing to support the existing EMS with internal resources is significant. Without the ability to leverage the experience of a user community, such as would be the case if a single vendor system were implemented, HECO and its contractors would be exploring new areas in system development at each stage of the alternative.

In summary, the Dispatch Center and EMS were not justified on the basis of economics but rather were based on the critical operational need for this building and computer systems. The old dispatch center facility lacked the design and size that was required for a well functioning dispatch center. As the 1996 and 2003 reports pointed out the old dispatch center was lacking in functionality as the dispatchers were unable to adequately view the information that was posted on the wallboards and during emergency periods. The EMS had reached the end of its useful life and HECO resources were having difficulty maintaining the system because of obsolescence. In addition there were other limiting factors as a result of its older design that constrained how the system could be used and what functionality could be provided in the future. The overriding concern however, was the technical obsolescence of the hardware that if not dealt with would render the EMS useless.

b. The reasons for implementing the New Dispatch Center and Energy Management System project were based on the operational necessities and critical state of the existing Rockwell EMS as identified in response to subpart a. of this request. The expense impact of the new Siemens EMS is explained in response to CA-IR-105 and is categorized in Transmission Operation expense in NARUC account 560.

c. See response to a.

CA-IR-182

Ref: CA-IR-5, page 84 HECO Annual Report (Advanced Meter Infrastructure (AMI)/ Broadband Over Power Line).

According to the Annual Report, "HECO is evaluating the feasibility of utility applications using power line and wireless technologies for two-way communication. HECO is currently partnering with Sensus Metering Systems to field test an Advanced Metering Infrastructure system that delivers hourly meter reads, which can enable time of use pricing options for HECO customers." Please provide the following information:

a. A detailed description of the Company's AMI studies and pilot program results to date, explaining whether and how HECO intends to proceed with further studies or investment in advanced metering or broadband over power line technologies.

b. Copies of all contracts between HECO and Sensus, Earthlink, City/County government and all other parties involved in the Company's efforts.

c. Copies of all reports, analyses, workpapers, projections and other documents prepared by or for HECO personnel to summarize the results of the trial of Broadband Over Power Line ("BPL") completed by HECO.

d. Copies of all reports, analyses, workpapers, projections and other documents prepared by or for HECO personnel to summarize the results of the trial of automatic meter reading pilot that was completed by HECO in late 2006.

e. State the amounts of test year rate base investment and operating expenses (if any) by NARUC account that are included in the asserted revenue requirement for BPL or AMI research or installations.

HECO Response:

a. In late 2006, HECO completed a small-scale research and development ("R&D") pilot project of Broadband over Power Lines ("BPL") technologies in a residential/commercial area in Honolulu. That effort was primarily focused on using BPL for utility applications such as automatic meter reading, which is aimed at enabling time-of-use rates for residential and commercial customers. While the results of the small scale pilot were successful, HECO is also evaluating other options that may be more cost-effective for providing similar utility

applications benefits such as using wireless technology. Confidential Attachments 2 and 2-A summarize the results of the BPL pilot program and are submitted pursuant to Protective Order No. 23378 (these documents contain confidential research and development information that, if disclosed, may harm the Company's future competitive position).

In August 2006, HECO executed an R&D Advanced Meter Infrastructure ("AMI") pilot project agreement with Sensus Metering Systems, Inc., ("Sensus") to evaluate the technical feasibility of the FlexNet 900 MHz wireless AMI solution in Hawaii's environment. The pilot project was successful in demonstrating the technical feasibility of the Sensus AMI solution. HECO is also conducting an R&D evaluation of intelligent sensors provided by Cooper Power Systems. The R&D evaluation entails the field test and evaluation of faulted circuit indicator ("FCI") leveraging the Sensus FlexNet communications technology. The R&D evaluation is scheduled to begin in May 2007 and run for a trial period of six months.

Because of the success of the ongoing R&D pilot project, HECO executed an expanded pilot project agreement with Sensus, dated January 9, 2007, to deploy AMI over an expanded coverage area, to include the Ocean Pointe subdivision. with the deployment of a third communication tower. The objective of this pilot project of HECO's AMI program is to test the usability of the Automated Meter Reading ("AMR") technology to bill residential and commercial customers in the Ocean Pointe subdivision. The scope of the project includes installing approximately 3,000 new residential and commercial FlexNet meters to customers within the Ocean Pointe subdivision. The meter installation work was completed in April 2007 and the AMR billing services are scheduled to begin in July 2007, upon which the pilot project facilities will be placed into service. Total cost of the pilot project is estimated to be

approximately $438,000, of which $392,000 is capital and is included in the 2007 test year plant additions, presented by Mr. Morikami (T-16) in his testimony.

HECO also intends to pursue an additional R&D pilot program in the latter half of 2007 (which is expected to last until the end of 2008) to evaluate residential Critical Peak Pricing ("CPP") and Peak Time Rebates ("PTR"). CPP is planned to be a tariff based program that increases the per kilowatthour price for electricity when the utility anticipates difficulty meeting the demand, while PTR will be a demand-side measure that provides a per kilowatthour rebate for each kilowatthour that is not used during a period in which the utility anticipates difficulty meeting the demand. Under this program, HECO will provide central air conditioning thermostats that are controllable by HECO through paging systems. HECO will remotely increase the temperature set point of the thermostats during a CPP or PTR event to assist the customer in reducing load. Since both CPP and PTR require load profile information in order to bill and/or credit the rebate, and because the periods during which the CPP and PTR may be initiated are not fixed, a significant amount of information must be available to HECO. The Sensus FlexNet AMI technology that HECO is evaluating can enable a pathway for these kinds of dynamic rate programs to be initiated. The estimated costs of the R&D portion of the pilot program is approximately $120,000 in 2007. At the next available opportunity, the 2007 test year will be adjusted for the additional CPP/PTR research and development costs. Refer to Attachment 4 for more information on the cost of this project.

In short, HECO is exploring wireless options and programs to increase customer offerings and improve customer services and enhance its energy conservation efforts.

b. HECO does not have any executed AMI related contracts with EarthLink or the City and

County of Honolulu ("C&C").

The following attachments contain confidential vendor or bid information and are provided under Protective Order No. 23378. :

Attachment 1	AMI Pilot Program Agreement with Sensus, dated August 1, 2006
Attachment 1-A	AMI Proposal with Cooper Power Systems, dated March 11, 2007
Attachment 1-B	AMI Pilot Program Proposal with KEMA, dated October 13, 2006 and Work Authorizations with KEMA, dated November 15, 2006
Attachment 1-C	Ocean Point AMI Pilot with Honeywell, dated December 14, 2006
Attachment 1-D	Ocean Point AMI Pilot with Sensus, dated January 9, 2007
Attachment 1-E	CPP AMI Pilot with Battle Group, dated March 1, 2007

c. See confidential Attachments 2 (BPL Status Meeting Presentation, dated November 15, 2005) and 2A (KEMA Benefit Cost Analysis, dated December 21, 2005), both of which are provided under Protective Order No. 23378. These documents contain confidential research and development information and disclosure of such information may harm the Company's future competitive and market position.

d. See Confidential Attachment 3 (AMI Briefing Presentation dated November 2006), which is provided under Protective Order No. 23378. This document contains confidential research and development information and disclosure of such information may harm the Company's future competitive and market position.

e. HECO's current estimate of rate base investment and operating expenses that are included in the 2007 test year for AMI related research or installations is approximately $1,074,000 as summarized in Attachment 4 (revised 6/12/07). HECO's test year 2007 rate case does not

include any BPL related costs, although approximately $62,000 is expected to be spent on decommissioning activities of the BPL pilot project. At the next available opportunity, the 2007 test year will be adjusted for the additional BPL pilot project costs.

Confidential Information Deleted
Pursuant to Protective Order No. 23378

CA-IR-182
DOCKET NO. 2006-0386
ATTACHMENTS 1-3

Attachments 1, 1-A, 1-B, 1-C, 1-D, 1-E, 2, 2-A, and 3 contain confidential information and are being provided subject to Protective Order No. 23378, dated April 23, 2007.

Hawaiian Electric Company, Inc.
AMI Costs
REVISED Test Year 2007 Estimate ($ In Thousands)

NARUC	[A] AMI R&D Pilot Note (1)	[B] Ocean Point Pilot	[C] CPP/PTR Pilot Note (2)	[A]+[B]+[C] Total TY 2007 REVISED
107		376		376
108		15		15
586		47		47
9302 - Labor	142			142
9302 - Nonlabor	374		120	494
Total	516	438	120	1,074

Note (1): The total AMI R&D project is discussed in B. Tamashiro's **(T-13)** direct testimony (T-13) at pages 12-15.

Note (2): Critical Peak Pricing and Peak Time Rebates estimate is based on: 1) $60,000 consultant contract for the design, development, and evaluation of a CPP/PTR pilot program (Consultant contract is provided in Attachment 1-F); and 2) an estimated 2007 budget (based on preliminary discussions with vendors) of $60,000 to develop a prototype load control receiver (LCR) that can communicate with the Flexnet system. The prototype development budget is as follows:

Cannon Hardware Development (Flexnet LCR)	$	20,000
Cannon Software Development (Yukon Integration)		20,000
Sensus Software and Radio Frequency Development		20,000
	$	60,000

CA-IR-182

Ref: CA-IR-5, page 84 HECO Annual Report (Advanced Meter Infrastructure (AMI)/ Broadband Over Power Line).

According to the Annual Report, "HECO is evaluating the feasibility of utility applications using power line and wireless technologies for two-way communication. HECO is currently partnering with Sensus Metering Systems to field test an Advanced Metering Infrastructure system that delivers hourly meter reads, which can enable time of use pricing options for HECO customers." Please provide the following information:

a. A detailed description of the Company's AMI studies and pilot program results to date, explaining whether and how HECO intends to proceed with further studies or investment in advanced metering or broadband over power line technologies.

b. Copies of all contracts between HECO and Sensus, Earthlink, City/County government and all other parties involved in the Company's efforts.

c. Copies of all reports, analyses, workpapers, projections and other documents prepared by or for HECO personnel to summarize the results of the trial of Broadband Over Power Line ("BPL") completed by HECO.

d. Copies of all reports, analyses, workpapers, projections and other documents prepared by or for HECO personnel to summarize the results of the trial of automatic meter reading pilot that was completed by HECO in late 2006.

e. State the amounts of test year rate base investment and operating expenses (if any) by NARUC account that are included in the asserted revenue requirement for BPL or AMI research or installations.

HECO Response:

a. In late 2006, HECO completed a small-scale research and development ("R&D") pilot project of Broadband over Power Lines ("BPL") technologies in a residential/commercial area in Honolulu. That effort was primarily focused on using BPL for utility applications such as automatic meter reading, which is aimed at enabling time-of-use rates for residential and commercial customers. While the results of the small scale pilot were successful, HECO is also evaluating other options that may be more cost-effective for providing similar utility applications benefits such as using wireless technology. Confidential Attachments 2 and 2-A

summarize the results of the BPL pilot program and are submitted pursuant to Protective Order No. 23378 (these documents contain confidential research and development information that, if disclosed, may harm the Company's future competitive position).

In August 2006, HECO executed an R&D Advanced Meter Infrastructure ("AMI") pilot project agreement with Sensus Metering Systems, Inc., ("Sensus") to evaluate the technical feasibility of the FlexNet 900 MHz wireless AMI solution in Hawaii's environment. The pilot project was successful in demonstrating the technical feasibility of the Sensus AMI solution. HECO is also conducting an R&D evaluation of intelligent sensors provided by Cooper Power Systems. The R&D evaluation entails the field test and evaluation of faulted circuit indicator ("FCI") leveraging the Sensus FlexNet communications technology. The R&D evaluation is scheduled to begin in May 2007 and run for a trial period of six months.

Because of the success of the ongoing R&D pilot project, HECO executed an expanded pilot project agreement with Sensus, dated January 9, 2007, to deploy AMI over an expanded coverage area, to include the Ocean Pointe subdivision. with the deployment of a third communication tower. The objective of this pilot project of HECO's AMI program is to test the usability of the Automated Meter Reading ("AMR") technology to bill residential and commercial customers in the Ocean Pointe subdivision. The scope of the project includes installing approximately 3,000 new residential and commercial FlexNet meters to customers within the Ocean Pointe subdivision. The meter installation work was completed in April 2007 and the AMR billing services are scheduled to begin in July 2007, upon which the pilot project facilities will be placed into service. Total cost of the pilot project is estimated to be approximately $483,000, of which $392,000 is capital and is included in the 2007 test year plant additions, presented by Mr. Morikami (T-16) in his testimony.

HECO also intends to pursue an additional R&D pilot program in the latter half of 2007 (which is expected to last until the end of 2008) to evaluate residential Critical Peak Pricing ("CPP") and Peak Time Rebates ("PTR"). CPP is planned to be a tariff based program that increases the per kilowatthour price for electricity when the utility anticipates difficulty meeting the demand, while PTR will be a demand-side measure that provides a per kilowatthour rebate for each kilowatthour that is not used during a period in which the utility anticipates difficulty meeting the demand. Under this program, HECO will provide central air conditioning thermostats that are controllable by HECO through paging systems. HECO will remotely increase the temperature set point of the thermostats during a CPP or PTR event to assist the customer in reducing load. Since both CPP and PTR require load profile information in order to bill and/or credit the rebate, and because the periods during which the CPP and PTR may be initiated are not fixed, a significant amount of information must be available to HECO. The Sensus FlexNet AMI technology that HECO is evaluating can enable a pathway for these kinds of dynamic rate programs to be initiated. The estimated costs of the R&D portion of the pilot program is approximately $120,000 in 2007. At the next available opportunity, the 2007 test year will be adjusted for the additional CPP/PTR research and development costs. Refer to Attachment 4 for more information on the cost of this project.

In short, HECO is exploring wireless options and programs to increase customer offerings and improve customer services and enhance its energy conservation efforts.

b. HECO does not have any executed AMI related contracts with EarthLink or the City and County of Honolulu ("C&C").

The following attachments contain confidential vendor or bid information and are provided under Protective Order No. 23378.

Attachment 1	AMI Pilot Program Agreement with Sensus, dated August 1, 2006
Attachment 1-A	AMI Proposal with Cooper Power Systems, dated March 11, 2007
Attachment 1-B	AMI Pilot Program Proposal with KEMA, dated October 13, 2006 and Work Authorizations with KEMA, dated November 15, 2006
Attachment 1-C	Ocean Point AMI Pilot with Honeywell, dated December 14, 2006
Attachment 1-D	Ocean Point AMI Pilot with Sensus, dated January 9, 2007
Attachment 1-E	CPP AMI Pilot with Battle Group, dated March 1, 2007

c. See confidential Attachments 2 (BPL Status Meeting Presentation, dated November 15, 2005) and 2A (KEMA Benefit Cost Analysis, dated December 21, 2005), both of which are provided under Protective Order No. 23378. These documents contain confidential research and development information and disclosure of such information may harm the Company's future competitive and market position.

d. See Confidential Attachment 3 (AMI Briefing Presentation dated November 2006), which is provided under Protective Order No. 23378. This document contains confidential research and development information and disclosure of such information may harm the Company's future competitive and market position.

e. HECO's current estimate of rate base investment and operating expenses that are included in the 2007 test year for AMI related research or installations is approximately $1,119,000 as summarized in Attachment 4. HECO's test year 2007 rate case does not include any BPL related costs, although approximately $62,000 is expected to be spent on decommissioning activities of the BPL pilot project. At the next available opportunity, the 2007 test year will be adjusted for the additional BPL pilot project costs.

Hawaiian Electric Company, Inc.
AMI Costs
REVISED Test Year 2007 Estimate ($ In Thousands)

NARUC	[A] AMI R&D Pilot Note (1)	[B] Ocean Point Pilot	[C] CPP/PTR Pilot Note (2)	[A]+[B]+[C] Total TY 2007 REVISED
107		376		376
108		15		15
586		92		92
9302 - Labor	142			142
9302 - Nonlabor	374		120	494
Total	516	483	120	1,119

Note (1): The total AMI R&D project is discussed in B. Tamashiro's **(T-13)** direct testimony (T-13) at pages 12-15.

Note (2): Critical Peak Pricing and Peak Time Rebates estimate is based on: 1) $60,000 consultant contract for the design, development, and evaluation of a CPP/PTR pilot program (Consultant contract is provided in Attachment 1-F); and 2) an estimated 2007 budget (based on preliminary discussions with vendors) of $60,000 to develop a prototype load control receiver (LCR) that can communicate with the Flexnet system. The prototype development budget is as follows:

Cannon Hardware Development (Flexnet LCR)	$	20,000
Cannon Software Development (Yukon Integration)		20,000
Sensus Software and Radio Frequency Development		20,000
	$	60,000

CA-IR-183

Ref: CA-IR-5, page 85 HECO Annual Report (Electronic Shock Absorber ESA).

According to the Annual Report, "HECO received a U.S. patent in February 2005 for an ESA that addresses power fluctuations from wind resources." Please provide the following information:

a. A detailed description of the Company's spending to date on ESA analysis and investment in facilities, by NARUC Account, indicating the funding provided by HECO, HELCO and MECO in each year.

b. A complete copy of the intellectual property agreement with S&C Electric Company.

c. Explain the Company's plans with regard to repair or replacement of the ESA demonstration system on the Big Island that was damaged in the earthquake.

d. Describe the Company's plans for broader deployment of ESA or alternative technologies with the State to address power fluctuation issues arising from wind generation.

e. State the amounts of test year rate base investment and operating expenses (if any) by NARUC account that are included in the asserted revenue requirement for ESA or other power fluctuation research or installations.

HECO Response:

a. A detailed description of the Company's spending to date on the ESA demonstration unit by HECO, HELCO and MECO in each year was provided in HECO-629, pages 10-12, of D. Giovanni's testimony (T-6). The NARUC account for HECO charges related to the ESA demonstration project is account 549, "Miscellaneous Other Power Generation Expenses." The majority of these charges were for materials (for designing, procuring parts and building the ESA demonstration unit). Other costs included outside services related to transportation and installation of the ESA demonstration unit.

b. A copy of the confidential intellectual property agreement with S&C Electric Company is provided as Attachment 1, pursuant to Protective Order No. 23378.

c. As stated in HECO-629, the future of the ESA will depend on the findings of the fire inspection/assessment report. To date, HECO has not received the final fire assessment report. However, HECO has communicated with the contractor and it appears, unfortunately, that the fire damage has rendered the ESA demonstration unit a total loss. The fire assessment report is to contain procedures for the disposal of the ESA demonstration unit.

d. The demand to increase renewable energy in Hawaii is driven by a number of reasons: reduce imported oil, use of indigenous renewable resources, protecting the environment, energy security and others. To this end, the state government has passed mandated laws with penalties to increase renewable energy in Hawaii (renewable portfolio standards). Wind energy is a mature, commercial technology that can be deployed on all islands utilizing varying levels of site-specific wind resources.

The Big Island and Maui already have about 33 MW and 30 MW, respectively, of commercial wind farms in operation and additional wind farms are being proposed on each island. Electricity from large, multi-megawatt wind farms are also being proposed for use on Oahu. With increasing penetration of wind power on the Hawaiian electric grids, the short-term power fluctuations from the wind farms have been causing, and are continuing to cause, significant problems in voltage stability and frequency swings. These problems are presenting challenges to the utilities' ability to maintain the overall stability of the electric grid. Wind farm susceptibility to faults on the utility systems can very quickly result in all of the wind generation tripping off the system. These wind impacts are currently being experienced by utilities in Hawaii and are now a major concern with mainland and international electric utilities and grid operators as wind penetration increases on the lower voltage transmission lines. The ESA system can provide voltage regulation and power fluctuation smoothing to the utility grid.

HECO is currently working with the Hawaii Natural Energy Institute at the University of Hawaii on securing federal funds from the U. S. Department of Energy ("USDOE") for a multi-year project to examine technologies (i.e., ESA, battery energy storage, etc.) that can help ameliorate the issues (power fluctuation issues, frequency, etc. arising from wind generation) related to wind energy integration on an electric utility grid. The intent is to use ESA rate case monies and utility resources as cost-share to leverage federal dollars to build and test an ESA and other energy storage devices (e.g., battery energy storage systems) at a commercial wind farm facility on the islands. The proposal to USDOE will be submitted in June 2007. The awards will be made in the fall of 2007. In the event that this particular proposal is not funded, HECO will continue to work with the Hawaii Natural Energy Institute and other organizations to seek extramural funds towards ESA- related activity.

e. As described in HECO-629, the ESA demonstration unit was installed in late 2005 at the Lalamilo wind farm substation. Because the development of the ESA demonstration unit is considered a research & development project, the costs of the project were expensed and not capitalized. Thus, there are no amounts included in the test year rate base. $221,000 in expenses related to the ESA project is included in the test year revenue requirement in NARUC account 549. This is detailed in the response to CA-IR-2, Attachment 18, page 2.

Confidential Information Deleted
Pursuant to Protective Order No. 23378

CA-IR-183
DOCKET NO. 2006-0386
ATTACHMENT 1
PAGES 1-10 OF 10

Attachment 1 contains confidential information and is being provided subject to Protective Order No. 23378, dated April 23, 2007.

CA-IR-184

Ref: CA-IR-5, page 131 HECO Annual Report (East Oahu Transmission Project).

According to the Annual Report, "As of December 31, 2006, the accumulated costs recorded for the EOTP amounted to $30 million…." Please provide the following information:

a. A breakdown of EOTP incurred costs by NARUC account as of December 31, 2006.

b. Describe whether any costs associated with EOTP have been included in the asserted test year revenue requirement.

c. Provide complete copies of any documents associated with your response to part b. of this information request.

HECO Response:

a. The accumulated costs for the East Oahu Transmission Project ("EOTP") amounting to approximately $30 million as of December 31, 2006, is recorded in NARUC Account No. 107, Construction Work in Progress ("CWIP").

b. Since the costs related to EOTP are included in CWIP, the costs are not included in HECO's 2007 test year revenue requirements. However, costs included in CWIP accumulate AFUDC.

c. As shown on HECO's presentation of rate base in HECO-1701, HECO does not include CWIP in rate base.

CA-IR-185 **Ref: T-1, page 9, HECO-111, 112 (Equal Percentage Increase).**

a. Please state and explain all reasons why HECO is proposing an "equal percentage increase" over present rates in this Docket, given the results of its class cost of service analysis.

b. If the revenue requirement approved by the Commission is significantly lower than the recommended amounts shown in HECO-111 and HECO-112, does the Company intend to modify its "equal percentage increase" recommendation?

c. If your response to part b. is affirmative, please state with specificity the expected changes to be made and the basis for alternative revenue distribution positions so that the Consumer Advocate will have an opportunity to respond to any alternative positions in its testimony.

HECO Response:

a. HECO is proposing an equal percentage increase over present rates across the classes of service to effect an even sharing of the burden of the proposed increase across all customers. Allocating the revenue increase to equalize the rate of return across classes would result in residential customers bearing a disproportionate share of the revenue increase and large power users incurring a relatively small percentage increase in rates.

b. The Company is unable to say at this time whether it would change its interclass revenue allocation methodology without knowing the specific revenue requirement and the outcome of other issues either agreed to by the Parties and/or approved by the Commission. If the approved revenue increase is very small, the Company might consider allocating the revenue increase more according to cost of service since the revenue increase on any one class would be nominal.

c. Not applicable.

CA-IR-186

Ref: T-1, page 8, lines 25-28 (HECO Earnings at Present Rates).

Please provide complete copies of all documents developed and circulated among HECO employees to inform them of budget reductions and/or cost savings to be implemented as a result of financial considerations during 2005, 2006 and 2007, to date.

HECO Response:

For 2005, refer to HECO's response to CA-IR-14 in HECO's 2005 test year rate case, Docket No. 04-0113, which provides a description of the process used by management to address any adjustments to the budget, whether they are reductions or increases. Included as part of the response, is a summary of the allocation to the Vice President, of an unspecified target reduction for 2005, of which the respective target reduction and final budget amounts were communicated to the Vice President.

For 2006, refer to CA-IR-119 for a copy of the interoffice correspondence to officers and their direct reports, which relates to Company-wide budgeting guidelines for the 2006 budget. In addition, as stated in HECO's response to CA-IR-132 an unspecified target reduction of $7,829,000 was included in the 2006 budget. Attached is a summary of the allocation of the target adjustment to the process areas. These targets were discussed at an executive staff meeting. No formal interoffice correspondence informing employees of these targets was issued.

For 2007, as part of the budget process (see HECO T-10, pages 39 and 40), the Company's officers and witnesses reviewed the O&M budget. Any adjustments after the reviews by the Company's officers and witnesses were included in the 2007 O&M expense budget which became the starting point for the test year 2007 O&M expense estimates. There are no documents which were developed and circulated among HECO employees to inform them of budget reductions and /or cost savings to be implemented.

Hawaiian Electric Company, Inc.
2006 O&M Budget w/o DSM/IRP

VP	2006 Budget Before Target Allocation	Target Allocation	2006 O&M Budget w/o DSM/IRP
Corporate Excellence	49,916,866	1,985,662	47,931,204
Corporate Relations	1,738,903	88,128	1,650,775
Customer Solutions	5,962,782	231,176	5,731,606
Energy Delivery	40,214,917	1,254,424	38,960,493
Energy Solutions	3,786,433	411,960	3,374,473
Finance	24,082,509	999,036	23,083,473
General Counsel	2,117,582	100,212	2,017,370
Government and Community Affairs	3,165,453	128,916	3,036,537
Miscellaneous	-45,651,163	-2,158,692	-43,492,471
Operations	15,472,020	345,773	15,126,247
President	4,916,982	280,488	4,636,494
Public Affairs	1,397,056	78,576	1,318,480
Power Supply	70,675,731	4,069,092	66,606,639
Special Projects	301,924	14,400	287,524
	178,097,995	7,829,151	170,268,844

CA-IR-187

Ref: T-2, page 18 (Schedule R Customer Projections).
Please provide a complete documentation of the "additive linear trend time series model" and supporting calculations for all adjustments made to customer count input assumptions for Kukui gardens and the 215 N. King Street customers (hard copy and Excel files, if available).

HECO Response:

The requested documentation is attached on pages 2 through 4 of this response. Please note that these pages were also made available for review as part of HECO's voluminous response to CA-IR-44. The electronic versions of pages 2 through 4 and the file used in the derivation of the forecast are provided on a compact disc.

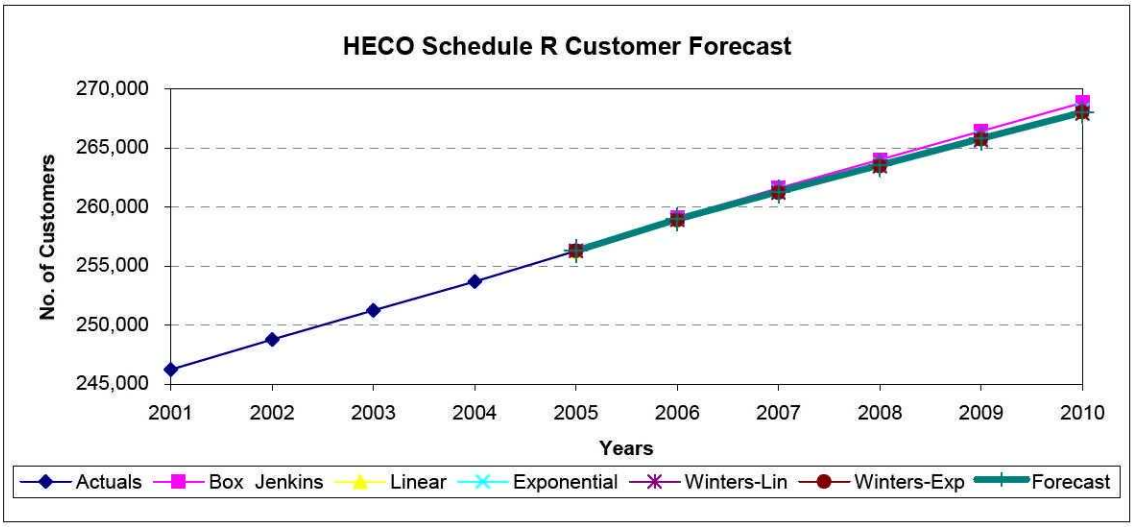
The test year estimate for the number of residential customers is based on a linear projection of historical data. The historical data series was adjusted to exclude the increase in bills associated with two specific out of trend projects. The first was the conversion of a master metered housing project to 850 individual meters beginning in May 2005. The second was the opening of one 240 unit individually metered condominium project in late 2005.

Both of these events are considered atypical and out of trend. Although HECO has recently seen and is expecting a number of new residential condominium developments over the next few years, the vast majority of such projects are master metered and not individually metered. Similarly, HECO is not aware of any other recent or planned conversions of housing units from master meters to individual meters.

HECO - SCHEDULE " R " CUSTOMERS
August 2006 Sales Forecast

	Actuals	Box Jenkins	Linear	Exponential	Winters-Lin	Winters-Exp	Forecast
1994	232,010						
1995	234,832						
1996	236,849						
1997	238,269						
1998	239,487						
1999	241,167						
2000	243,512						
2001	246,225						
2002	248,765						
2003	251,248						
2004	253,670						
2005	256,269	256,269	256,269	256,269	256,269	256,269	256,269
2006		259,084	258,964	258,960	258,901	258,894	258,964
2007		261,596	261,302	261,312	261,224	261,225	261,302
2008		264,013	263,543	263,587	263,450	263,476	263,543
2009		266,429	265,784	265,882	265,675	265,748	265,784
2010		268,846	268,026	268,198	267,901	268,038	268,026
2011		271,262	270,267	270,533	270,126	270,349	270,267

1994							
1995	1.2%						
1996	0.9%						
1997	0.6%						
1998	0.5%						
1999	0.7%						
2000	1.0%						
2001	1.1%						
2002	1.0%						
2003	1.0%						
2004	1.0%						
2005	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%	1.0%
2006		1.1%	1.1%	1.1%	1.0%	1.0%	1.1%
2007		1.0%	0.9%	0.9%	0.9%	0.9%	0.9%
2008		0.9%	0.9%	0.9%	0.9%	0.9%	0.9%
2009		0.9%	0.9%	0.9%	0.8%	0.9%	0.9%
2010		0.9%	0.8%	0.9%	0.8%	0.9%	0.8%
2011		0.9%	0.8%	0.9%	0.8%	0.9%	0.8%



Source: *p res cust fct Aug06.xls* summarizing trend models run on data adjusted for new condos (Kukui Gardens 5/05-on and 215 N. King St. 12/05-on adjusted for in data) with actual data through April 2006. Linear model results used for forecast.

Hawaiian Electric Company, Inc.
SCHEDULE "R" AVERAGE MONTHLY BILLS

Method	Index	Actual 2005	2006	2007	2008	2009	2010	2011
Models using data through Apr 2006 with large new residential condos excluded from historical								
Box Jenkins	0.9994	256,269	259,084	261,596	264,013	266,429	268,846	271,262
(Data 80-Apr06) % Incr.			1.1	1.0	0.9	0.9	0.9	0.9
Linear	0.9995	256,269	258,964	261,302	263,543	265,784	268,026	270,267
(Data 80-Apr06) % Incr.			1.1	0.9	0.9	0.9	0.8	0.8
Exponential	0.9995	256,269	258,960	261,312	263,587	265,882	268,198	270,533
(Data 80-Apr06) % Incr.			1.1	0.9	0.9	0.9	0.9	0.9
Winters - Linear	0.9995	256,269	258,901	261,224	263,450	265,675	267,901	270,126
(Data 80-Apr06) % Incr.			1.0	0.9	0.9	0.8	0.8	0.8
Winters - Exponential	0.9995	256,269	258,894	261,225	263,476	265,748	268,038	270,349
(Data 80-Apr06) % Incr.			1.0	0.9	0.9	0.9	0.9	0.9
Models using data through 2005 with large new residential condos included in historical								
Box Jenkins	0.9994	256,269	259,085	261,635	264,184	266,734	269,283	271,832
(Data 80-05) % Incr.			1.1	1.0	1.0	1.0	1.0	0.9
Linear	0.9995	256,269	259,154	261,675	264,195	266,716	269,237	271,758
(Data 80-05) % Incr.			1.1	1.0	1.0	1.0	0.9	0.9
Exponential	0.9995	256,269	259,228	261,908	264,617	267,354	270,119	272,912
(Data 80-05) % Incr.			1.2	1.0	1.0	1.0	1.0	1.0
Winters - Linear	0.9994	256,269	259,214	261,914	264,614	267,314	270,014	272,715
(Data 80-05) % Incr.			1.1	1.0	1.0	1.0	1.0	1.0
Winters - Exponential	0.9994	256,269	259,214	261,890	264,594	267,325	270,085	272,873
(Data 80-05) % Incr.			1.1	1.0	1.0	1.0	1.0	1.0
Recommended		**256,269**	**258,964**	**261,302**	**263,543**	**265,784**	**268,026**	**270,267**
% Incr.			**1.1**	**0.9**	**0.9**	**0.9**	**0.8**	**0.8**

Note: 2005 historical base with growth rate from exponential model using historical data adjusted to exclude individually metered condos that opened in late 2005 - early 2006.

Hawaiian Electric Company, Inc.
Monthly Billed Schedule R/E Customers

		R/RT/E Bills	Increase prior mon	prior year		YOY gwth	YTD gwth	Res Customers w/o new condos	Cust #1	Cust #2	YOY gwth	YTD gwth
2003	jan	250,384	488	2,324		0.9%	0.9%					
	feb	250,128	-256	2,406		1.0%	1.0%					
	mar	250,661	533	2,501		1.0%	1.0%					
	apr	250,688	27	2,222		0.9%	1.0%					
	may	250,787	99	2,169		0.9%	0.9%					
	jun	250,466	-321	2,337		0.9%	0.9%					
	jul	251,412	946	2,578		1.0%	1.0%					
	aug	250,927	-485	2,299		0.9%	0.9%					
	sep	252,167	1,240	2,783		1.1%	1.0%					
	oct	252,096	-71	2,531		1.0%	1.0%					
	nov	252,230	134	2,509		1.0%	1.0%					
	dec	253,033	803	3,137	251,248	1.3%	1.0%					
2004	jan	253,130	97	2,746		1.1%	1.1%	253,130				
	feb	252,587	-543	2,459		1.0%	1.0%	252,587				
	mar	253,502	915	2,841		1.1%	1.1%	253,502				
	apr	253,152	-350	2,464		1.0%	1.0%	253,152				
	may	253,130	-22	2,343		0.9%	1.0%	253,130				
	jun	253,328	198	2,862		1.1%	1.0%	253,328				
	jul	253,333	5	1,921		0.8%	1.0%	253,333				
	aug	253,883	550	2,956		1.2%	1.0%	253,883				
	sep	254,959	1,076	2,792		1.1%	1.0%	254,959				
	oct	253,878	-1,081	1,782		0.7%	1.0%	253,878				
	nov	254,365	487	2,135		0.8%	1.0%	254,365				
	dec	254,797	432	1,764	253,670	0.7%	1.0%	254,797				
2005	jan	255,270	473	2,140		0.8%	0.8%	255,270			0.8%	0.8%
	feb	255,086	-184	2,499		1.0%	0.9%	255,086			1.0%	0.9%
	mar	255,502	416	2,000		0.8%	0.9%	255,502			0.8%	0.9%
	apr	255,559	57	2,407		1.0%	0.9%	255,559			1.0%	0.9%
	may	255,566	7	2,436		1.0%	0.9%	255,486	80		0.9%	0.9%
	jun	256,189	623	2,861		1.1%	0.9%	255,687	502		0.9%	0.9%
	jul	256,360	171	3,027		1.2%	1.0%	255,494	866		0.9%	0.9%
	aug	256,883	523	3,000		1.2%	1.0%	256,016	867		0.8%	0.9%
	sep	256,706	-177	1,747		0.7%	1.0%	255,842	864		0.3%	0.8%
	oct	256,962	256	3,084		1.2%	1.0%	256,089	873		0.9%	0.8%
	nov	257,345	383	2,980		1.2%	1.0%	256,470	875		0.8%	0.8%
	dec	257,804	459	3,007	256,269	1.2%	1.0%	256,935	869		0.8%	0.8%
2006	jan	258,576	772	3,306		1.3%	1.3%	257,488	874	214	0.9%	0.8%
	feb	257,990	-586	2,904		1.1%	1.2%	256,892	868	230	0.7%	0.8%
	mar	258,754	764	3,252		1.3%	1.2%	257,638	868	248	0.8%	0.8%
	apr	258,533	-221	2,974		1.2%	1.2%	257,430	853	250	0.7%	0.8%
	may											
	jun											
	jul											
	aug											
	sep											
	oct											
	nov											
	dec											

Cust #1 meters inadvertently started in Sep
then reversed in Oct. Sep high by 593, Oct low by 593.

CA-IR-188

Ref: T-2, page 21 (Commercial Customer Projections).
Please provide a complete copy of all time series models used by HECO to develop its test year commercial customer count projections, including modifications or separate modeling used for Schedule H (hard copy and Excel files, if available).

HECO Response:

The requested documentation is attached on pages 2 through 11 of this response. Please note that these pages were also made available for review as part of HECO's voluminous response to CA-IR-44. The electronic version of the derivation of the forecasts is provided on a compact disc.

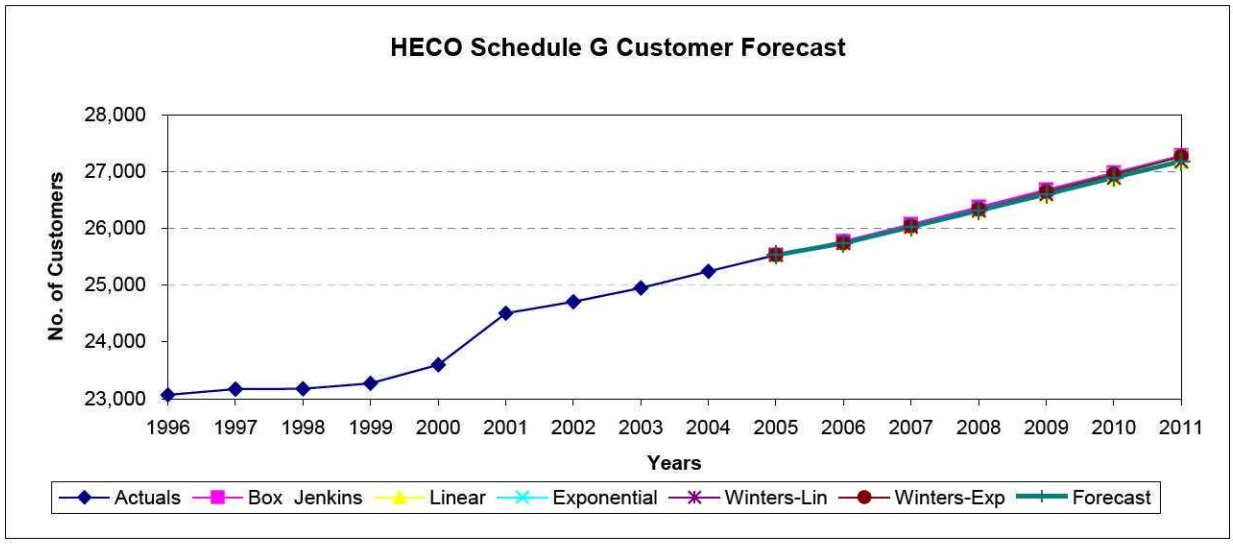
For all commercial rate schedules other than schedule H, the recommended number of customers is based on a linear projection of historical data.

In the case of Schedule H, a Winters exponential trend model (Winters models use either linear or exponential trends with a multiplicative seasonal component rather than an additive seasonal component) was selected because the model results appeared to most closely match the rapidly declining trend shown by Schedule H customers in recent years that was not shown in earlier years. An exponential trend model is well suited to modeling trends that have occurred or changed recently. This type of model gives more weight to recent observations and smaller weight to historically distant observations.

For Schedules J and H, all of the models did not appear to capture the rapid change in the near term, so the model results were modified by multiplying the rate by an additional factor (1.5 times and 1.25 times the model rates for Schedule J and H, respectively).

HECO - SCHEDULE " G " CUSTOMERS
August 2006 Sales Forecast

	Actuals	Box Jenkins	Linear	Exponential	Winters-Lin	Winters-Exp	Forecast
1994	21,935						
1995	22,793						
1996	23,075						
1997	23,176						
1998	23,181						
1999	23,274						
2000	23,605						
2001	24,507						
2002	24,710						
2003	24,952						
2004	25,245						
2005	25,533	25,533	25,533	25,533	25,533	25,533	25,533
2006		25,774	25,744	25,743	25,741	25,740	25,744
2007		26,076	26,032	26,042	26,029	26,039	26,032
2008		26,378	26,319	26,344	26,316	26,341	26,319
2009		26,680	26,606	26,650	26,604	26,646	26,606
2010		26,982	26,894	26,959	26,891	26,955	26,894
2011		27,284	27,181	27,272	27,178	27,268	27,181
1994							
1995	3.9%						
1996	1.2%						
1997	0.4%						
1998	0.0%						
1999	0.4%						
2000	1.4%						
2001	3.8%						
2002	0.8%						
2003	1.0%						
2004	1.2%						
2005	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%	1.1%
2006		0.9%	0.8%	0.8%	0.8%	0.8%	0.8%
2007		1.2%	1.1%	1.2%	1.1%	1.2%	1.1%
2008		1.2%	1.1%	1.2%	1.1%	1.2%	1.1%
2009		1.1%	1.1%	1.2%	1.1%	1.2%	1.1%
2010		1.1%	1.1%	1.2%	1.1%	1.2%	1.1%
2011		1.1%	1.1%	1.2%	1.1%	1.2%	1.1%



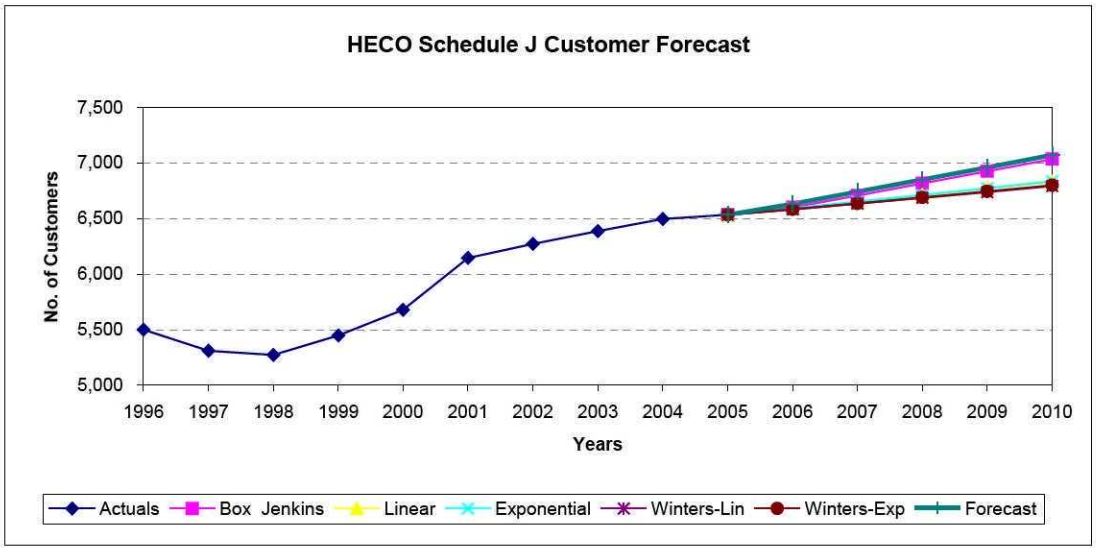
Note: Linear model (May 2006 with actual data through 2005) used for forecast.

Hawaiian Electric Company, Inc.
SCHEDULE "G" AVERAGE MONTHLY BILLS

Method	Index	Actual 2005	2006	2007	2008	2009	2010	2011
Box Jenkins	0.9842	25,533	25,774	26,076	26,378	26,680	26,982	27,284
(Data 86-05) % Incr.			0.9	1.2	1.2	1.1	1.1	1.1
Linear	0.9871	25,533	25,744	26,032	26,319	26,606	26,894	27,181
(Data 86-05) % Incr.			0.8	1.1	1.1	1.1	1.1	1.1
Exponential	0.9868	25,533	25,743	26,042	26,344	26,650	26,959	27,272
(Data 86-05) % Incr.			0.8	1.2	1.2	1.2	1.2	1.2
Winters - Linear	0.9870	25,533	25,741	26,029	26,316	26,604	26,891	27,178
(Data 86-05) % Incr.			0.8	1.1	1.1	1.1	1.1	1.1
Winters - Exponential	0.9868	25,533	25,740	26,039	26,341	26,646	26,955	27,268
(Data 86-05) % Incr.			0.8	1.2	1.2	1.2	1.2	1.2

HECO - SCHEDULE "J" CUSTOMERS *
August 2006 Sales Forecast

	Actuals	Box Jenkins	Linear	Exponential	Winters-Lin	Winters-Exp	Forecast
1994	5,020						
1995	5,410						
1996	5,501						
1997	5,311						
1998	5,274						
1999	5,450						
2000	5,681						
2001	6,147						
2002	6,275						
2003	6,390						
2004	6,498						
2005	6,536	6,536	6,536	6,536	6,536	6,536	6,536
2006		6,602	6,593	6,594	6,585	6,585	6,635
2007		6,711	6,653	6,655	6,638	6,639	6,745
2008		6,820	6,712	6,716	6,690	6,693	6,855
2009		6,929	6,772	6,777	6,743	6,747	6,965
2010		7,038	6,831	6,840	6,795	6,802	7,075
2011		7,147	6,890	6,903	6,848	6,857	7,185
1994							
1995	7.8%						
1996	1.7%						
1997	-3.5%						
1998	-0.7%						
1999	3.3%						
2000	4.2%						
2001	8.2%						
2002	2.1%						
2003	1.8%						
2004	1.7%						
2005	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
2006		1.0%	0.9%	0.9%	0.7%	0.7%	1.5%
2007		1.7%	0.9%	0.9%	0.8%	0.8%	1.7%
2008		1.6%	0.9%	0.9%	0.8%	0.8%	1.6%
2009		1.6%	0.9%	0.9%	0.8%	0.8%	1.6%
2010		1.6%	0.9%	0.9%	0.8%	0.8%	1.6%
2011		1.5%	0.9%	0.9%	0.8%	0.8%	1.6%



* Including Schedule U

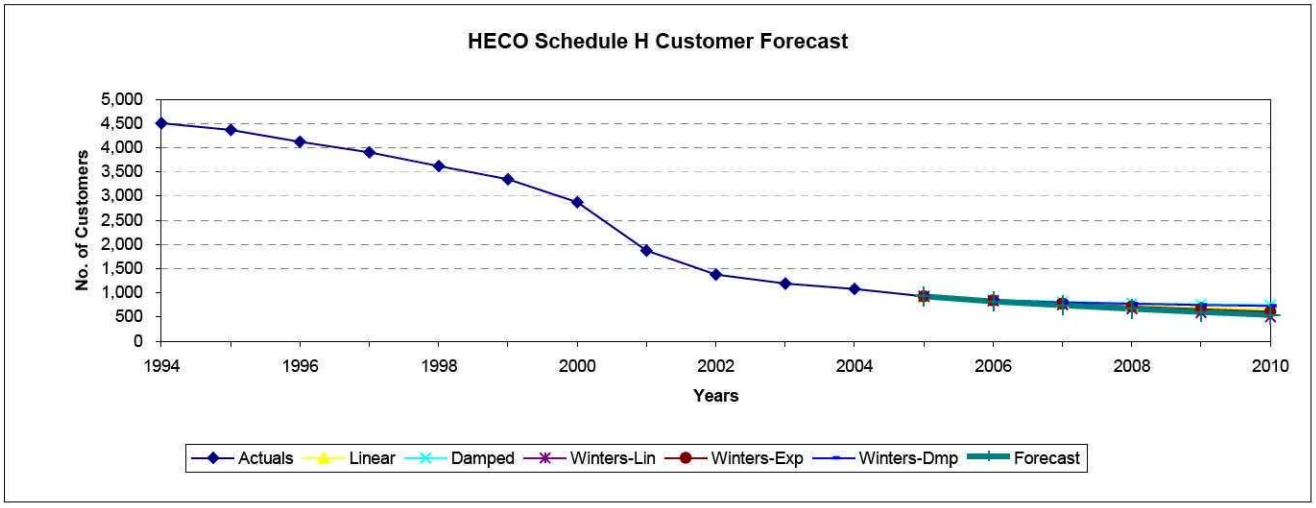
Note: Linear model (May 2006 with actual data through 2005) used for forecast, 1.5 times the model growth rate in 2006, then model rates thereafter.

Hawaiian Electric Company, Inc.
SCHEDULE "J/U" AVERAGE MONTHLY BILLS

Method	Index	Actual 2005	2006	2007	2008	2009	2010	2011
Box Jenkins	0.9946	6,536	6,602	6,711	6,820	6,929	7,038	7,147
(Data 86-05) % Incr.			1.0	1.7	1.6	1.6	1.6	1.5
Linear	0.9956	6,536	6,593	6,653	6,712	6,772	6,831	6,890
(Data 86-05) % Incr.			0.9	0.9	0.9	0.9	0.9	0.9
Exponential	0.9956	6,536	6,594	6,655	6,716	6,777	6,840	6,903
(Data 86-05) % Incr.			0.9	0.9	0.9	0.9	0.9	0.9
Winters - Linear	0.9956	6,536	6,585	6,638	6,690	6,743	6,795	6,848
(Data 86-05) % Incr.			0.7	0.8	0.8	0.8	0.8	0.8
Winters - Exponential	0.9956	6,536	6,585	6,639	6,693	6,747	6,802	6,857
(Data 86-05) % Incr.			0.7	0.8	0.8	0.8	0.8	0.8

HECO - SCHEDULE " H " CUSTOMERS
August 2006 Sales Forecast

	Actuals	Box Jenkins	Linear	Exponential	Damped	Winters-Lin	Winters-Exp	Winters-Dmp	Forecast
1994	4,512	not							
1995	4,374	considered							
1996	4,125	showed							
1997	3,906	negative							
1998	3,626	customers							
1999	3,354								
2000	2,879								
2001	1,880								
2002	1,384								
2003	1,194								
2004	1,083								
2005	931		931	931	931	931	931	931	931
2006			860	863	859	841	846	854	825
2007			811	826	819	759	781	810	746
2008			762	791	790	677	721	778	674
2009			713	758	769	595	666	753	610
2010			664	726	753	512	615	736	552
2011			615	695	742	430	568	723	499
1994									
1995	-3.1%								
1996	-5.7%								
1997	-5.3%								
1998	-7.2%								
1999	-7.5%								
2000	-14.2%								
2001	-34.7%								
2002	-26.4%								
2003	-13.7%								
2004	-9.3%								
2005	-14.0%		-14.0%	-14.0%	-14.0%	-14.0%	-14.0%	-14.0%	-14.0%
2006			-7.6%	-7.3%	-7.7%	-9.7%	-9.1%	-8.3%	-11.4%
2007			-5.7%	-4.3%	-4.7%	-9.8%	-7.7%	-5.2%	-9.6%
2008			-6.0%	-4.2%	-3.5%	-10.8%	-7.7%	-4.0%	-9.7%
2009			-6.4%	-4.2%	-2.7%	-12.1%	-7.6%	-3.2%	-9.5%
2010			-6.9%	-4.2%	-2.1%	-13.9%	-7.7%	-2.3%	-9.5%
2011			-7.4%	-4.3%	-1.5%	-16.0%	-7.6%	-1.8%	-9.6%



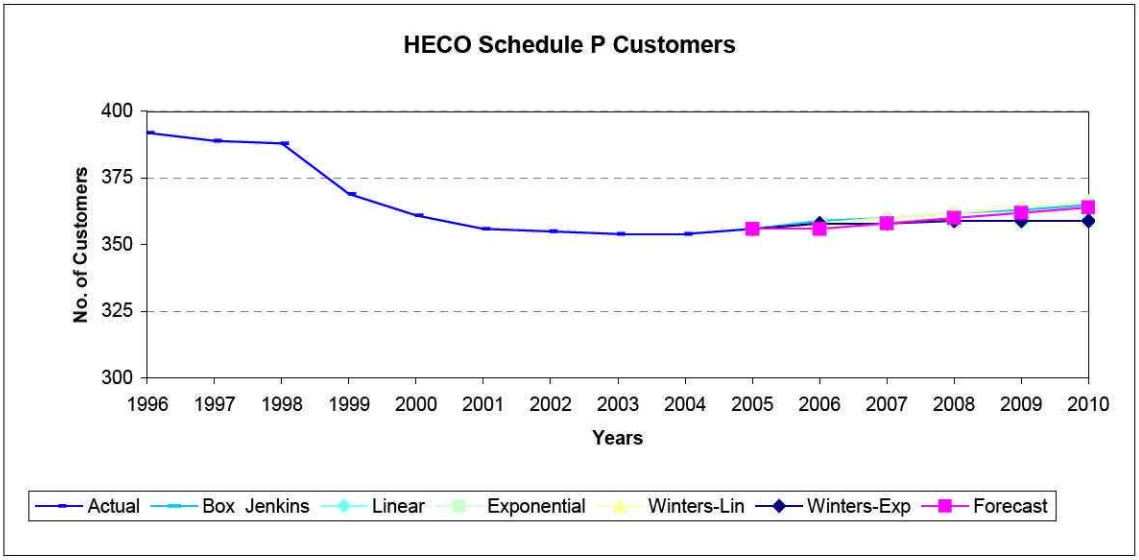
Note: Winters Exponential model (May 2006 with actual data through 2005) used for forecast,
1.25 times the model growth rate .

Hawaiian Electric Company, Inc.
SCHEDULE "H" AVERAGE MONTHLY BILLS

Method	Index	Actual 2005	2006	2007	2008	2009	2010	2011
Box Jenkins	0.9979	931	758	505	252	-1	-254	-507
(Data 86-05) % Incr.			-19	-33	-50	-100	25300	100
Linear	0.9983	931	860	811	762	713	664	615
(Data 86-05) % Incr.			-8	-6	-6	-6	-7	-7
Exponential	0.9984	931	863	826	791	758	726	695
(Data 86-05) % Incr.			-7	-4	-4	-4	-4	-4
Damped	0.9983	931	859	819	790	769	753	742
(Data 86-05) % Incr.			-8	-5	-4	-3	-2	-1
Winters - Linear	0.9980	931	841	759	677	595	512	430
(Data 86-05) % Incr.			-10	-10	-11	-12	-14	-16
Winters - Exponential	0.9981	931	846	781	721	666	615	568
(Data 86-05) % Incr.			-9	-8	-8	-8	-8	-8
Winters - Damped	0.9981	931	854	810	778	753	736	723
(Data 86-05) % Incr.			-8	-5	-4	-3	-2	-2

HECO - SCHEDULE " P " CUSTOMERS
August 2006 Sales Forecast

	Actual	Box Jenkins	Linear	Exponential	Winters-Lin	Winters-Exp	Forecast
1994	435						
1995	393						
1996	392						
1997	389						
1998	388						
1999	369						
2000	361						
2001	356						
2002	355						
2003	354						
2004	354						
2005	356	356	356	356	356	356	356
2006		359	358	358	358	358	356
2007		360	360	358	360	358	358
2008		362	362	359	362	359	360
2009		363	364	359	364	359	362
2010		365	366	359	366	359	364
2011		367	367	360	367	360	365
1994							
1995	-9.7%						
1996	-0.3%						
1997	-0.8%						
1998	-0.3%						
1999	-4.9%						
2000	-2.2%						
2001	-1.4%						
2002	-0.3%						
2003	-0.3%						
2004	0.0%						
2005	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%	0.6%
2006		0.8%	0.6%	0.6%	0.6%	0.6%	0.0%
2007		0.3%	0.6%	0.0%	0.6%	0.0%	0.6%
2008		0.6%	0.6%	0.3%	0.6%	0.3%	0.6%
2009		0.3%	0.6%	0.0%	0.6%	0.0%	0.6%
2010		0.6%	0.5%	0.0%	0.5%	0.0%	0.6%
2011		0.5%	0.3%	0.3%	0.3%	0.3%	0.3%



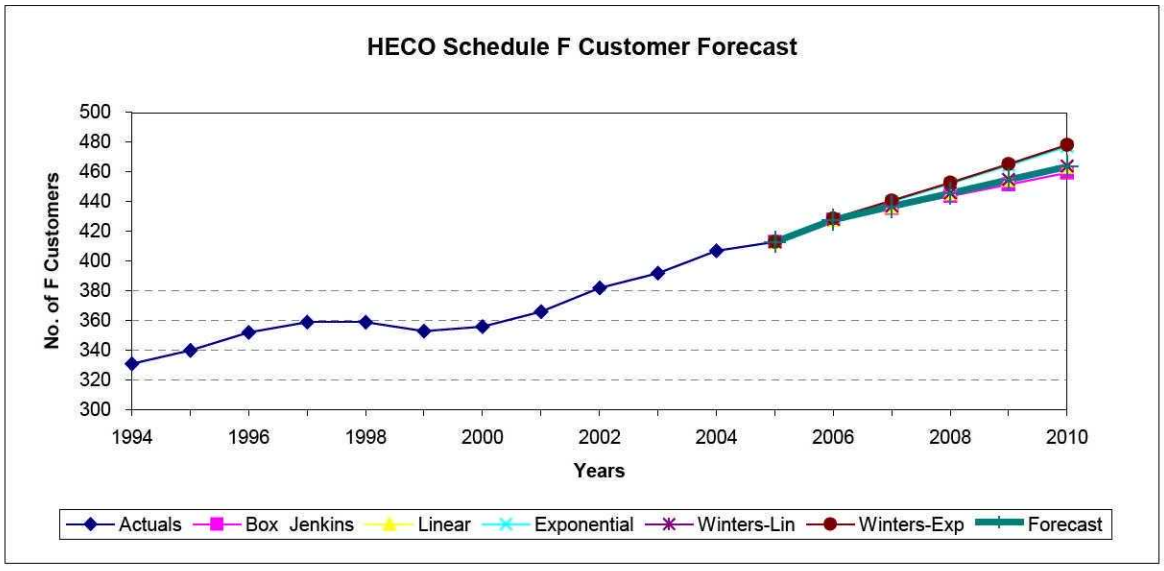
Note: Linear model (May 2006 with actual data through 2005) growth used for 2007 - 2011 forecast assuming YTD July 2006 as 2006 customer forecast (no new P expected through Dec).

Hawaiian Electric Company, Inc.
SCHEDULE "P" AVERAGE MONTHLY BILLS

Method	Index	Actual 2005	2006	2007	2008	2009	2010	2011
Box Jenkins	0.9197	356	359	360	362	363	365	367
(Data 80-05) % Incr.			0.8	0.3	0.6	0.3	0.6	0.5
Linear	0.9278	356	358	360	362	364	366	367
(Data 80-05) % Incr.			0.6	0.6	0.6	0.6	0.5	0.3
Exponential	0.9270	356	358	358	359	359	359	360
(Data 80-05) % Incr.			0.6	0.0	0.3	0.0	0.0	0.3
Winters - Linear	0.9274	356	358	360	362	364	366	367
(Data 80-05) % Incr.			0.6	0.6	0.6	0.6	0.5	0.3
Winters - Exponential	0.9267	356	358	358	359	359	359	360
(Data 80-05) % Incr.			0.6	0.0	0.3	0.0	0.0	0.3

HECO - SCHEDULE " F " CUSTOMERS
August 2006 Sales Forecast

	Actuals	Box Jenkins	Linear	Exponential	Winters-Lin	Winters-Exp	Forecast
1994	331						
1995	340						
1996	352						
1997	359						
1998	359						
1999	353						
2000	356						
2001	366						
2002	382						
2003	392						
2004	407						
2005	413	413	413	413	413	413	413
2006		428	428	429	428	429	428
2007		436	437	440	437	441	437
2008		444	446	452	446	453	446
2009		452	455	464	455	465	455
2010		460	464	477	464	478	464
2011		468	473	490	473	492	473
1994							
1995	2.7%						
1996	3.5%						
1997	2.0%						
1998	0.0%						
1999	-1.7%						
2000	0.8%						
2001	2.8%						
2002	4.4%						
2003	2.6%						
2004	3.8%						
2005	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%
2006		3.6%	3.6%	3.8%	3.6%	3.8%	3.6%
2007		1.9%	2.1%	2.7%	2.1%	2.8%	2.1%
2008		1.8%	2.1%	2.7%	2.1%	2.8%	2.1%
2009		1.8%	2.0%	2.7%	2.0%	2.8%	2.0%
2010		1.8%	2.0%	2.7%	2.0%	2.8%	2.0%
2011		1.7%	1.9%	2.7%	1.9%	2.8%	1.9%



Note: Linear model (May 2006 with actual data through 2005) used for forecast.

Hawaiian Electric Company, Inc.
SCHEDULE "F" AVERAGE MONTHLY BILLS

Method	Index	Actual 2005	2006	2007	2008	2009	2010	2011
Box Jenkins	0.9068	413	428	436	444	452	460	468
(Data 82-04) % Incr.			3.6	1.9	1.8	1.8	1.8	1.7
Linear	0.9206	413	428	437	446	455	464	473
(Data 82-04) % Incr.			3.6	2.1	2.1	2.0	2.0	1.9
Exponential	0.9214	413	429	440	452	464	477	490
(Data 82-04) % Incr.			3.8	2.7	2.7	2.7	2.7	2.7
Winters - Linear	0.9207	413	428	437	446	455	464	473
(Data 82-04) % Incr.			3.6	2.1	2.1	2.0	2.0	1.9
Winters - Exponential	0.9215	413	429	441	453	465	478	492
(Data 82-04) % Incr.			3.8	2.8	2.8	2.8	2.8	2.8

CA-IR-189

Ref: HECO Response to CA-IR-46 (Actual 2007 to date vs. August 2006 GWh Sales).

Please provide the following information regarding the "Comparison of 2007 vs. August 2006 Forecast Recorded GWh Sales" table:

a. Updated information through April 2007 – Actual vs. Forecast.

b. Monthly versus projected customer count data for each rate schedule.

c. Explanations for any known causes of any material monthly fluctuations in actual GWh sales or actual customer count data.

d. Explanations for any known causes of any material variances between actual GWh sales or actual customer counts, relative to the August 2006 Forecast.

HECO Response:

a. The comparison of 2007 versus the August 2006 forecast updated for April data is confidential information and is provided pursuant to Protective Order No. 23378, dated April 28, 2007. The information is attached on page 3 of this response.

b. The monthly actual versus projected customer count data for each rate schedule year-to-date April 2007 is confidential information and is provided pursuant to Protective Order No. 23378, dated April 28, 2007. The information is attached on page 4 of this response.

c. The growth in the number of residential customers slowed significantly year-to-date April 2007 as compared to 2006. While customers continue to grow, beginning in December 2006, the growth rate dropped suddenly to about half of the average growth rate experienced in 2000 – 2006. This is likely due in large part to the slowing real estate market, including slower construction of new houses and slower pace of existing home re-sales as a result of high prices and higher mortgage interest rates.

Residential use per customer also remains lower than last year. The reason for this remains unclear because use is lower despite a growing economy, lower electricity prices,

higher cooling degree days, and only slightly lower humidity.

Sales to the commercial sector are flat as compared to April YTD 2006. There are no clear causes for the flat sales in the commercial sector, although military troop deployments and energy conservation efforts may have contributed to sluggish sales to military customers. This is partially offset by higher sales from three large high-rise condominiums that opened in 2006 – 2007 and temporarily higher maintenance related use at refineries.

d. See response to part c above.

Pages 3 to 4 contain confidential information and are being provided pursuant to Protective Order No. 23378, issued on April 23, 2007.

CA-IR-190

Ref: T-2, page 3 (Annual Forecasts).
Please provide a complete copy of HECO's draft updated 2007 annual forecast now being developed by HECO personnel, as discussed with Mr. Willoughby on May 3, 2007.

HECO Response:

The May 2007 Sales and Peak Forecast was initially approved by members of the executive staff on May 23, 2007 to begin the financial planning process for 2008 – 2012, and has not been made public. As a publicly traded company, HECO objects to providing a forecast that may have an impact on the Company's forecasted earnings and returns outlook prior to actual inclusion of the forecast in the financial planning process. For compliance with the Public Company Accounting Reform and Investor Protection Act of 2002, also know as the Sarbanes-Oxley Act, HECO instituted specific control processes that the Company follows when developing and adopting a forecast. HECO objects to releasing a document without fully subjecting it to these controls.

Without waiving the above objection, the forecast document is being provided subject to the amended Protective Order No. 23378, dated June 4, 2007. The document is attached on pages 4 - 51 of this response. The forecast is provided under protective order and remains confidential because it contains information that could have an impact on the Company's forecasted earnings and returns outlook that has not yet been incorporated into HECO's public statements.

The primary use for the May 2007 Sales and Peak Forecast will be to support financial planning efforts for 2008 and later years. The May 2007 forecast is not expected to have an impact on the Company's 2007 test year forecast of sales.

Pages 2 to 51 contain confidential information and are being provided pursuant to Amended Protective Order No. 23378, issued on June 4, 2007.

CA-IR-191 **Ref: HECO-WP-301, pages 1, 10, 17, 22, 92, 106 and 134 (Interim Rate Increase Revenues).**

The referenced workpapers in electronic form contain the amounts of Interim Increase as hard inputs with no supporting calculations. Please provide the calculations supporting these amounts.

HECO Response:

The hard inputs in question represent "Total Revenue at Current Effective Rates" and are derived by adding Total Revenue (before interim rate increase), and the Interim Rate Increase Revenues. The Interim Rate Increase Revenues can be determined by multiplying base revenue as shown page one (1) of Attachment 1 by the class interim rate increase as approved in Decision & Order No. 22050 in Docket 04-0113.

Pages two (2) through nine (9) of Attachment 1 reproduce the respective HECO-WP-301 pages, identifying the components included in base revenue.

Hawaiian Electric Company, Inc.
Docket No. 2006-0386
Test Year 2007
Estimation of Test Year Revenues

Rate Schedule	Base	Interim Rate increase %	Interim Rate increase $	
R	$261,396.5	6.60%	$17,252.2	R
G	$50,759.8	5.97%	$3,030.4	G
J	$208,770.8	6.40%	$13,361.3	J
H	$4,138.4	6.68%	$276.4	H
PS	$74,352.2	7.65%	$5,687.9	PS
PP	$169,286.6	7.04%	$11,917.8	PP
PT	$13,316.4	0.00%	$0.0	PT
F	$4,008.7	9.33%	$374.0	F
Total	$786,029.4			

HAWAIIAN ELECTRIC COMPANY, INC.
Docket No. 2006-0386, Test-Year 2007
SCHEDULE R - RESIDENTIAL SERVICE

ESTIMATE OF TEST YEAR REVENUES

		PRESENT RATES		
	BILLING UNITS	UNIT PRICE	REVENUES $1000S	
ENERGY CHARGE:	(MWH)	¢/kWh		
NON-FUEL ENERGY CHARGE	2,128,900	7.7814	$165,658.2	
BASE FUEL ENERGY CHARGE	2,128,900	3.5140	$74,809.5	
SUBTOTAL			$240,467.7	Base
CUSTOMER CHARGE:	BILLS	$/MONTH		
1 PHASE CHARGE	3,134,056	7.00	$21,938.4	
3 PHASE CHARGE	1,568	15.00	$23.5	
SUBTOTAL	3,135,624		$21,961.9	Base
ADJUSTMENTS:				
FUEL OIL ADJUSTMENT:	¢/KWH	7.299	$155,388.4	
RATE ADJUSTMENT (AES REFUND):	(%)	-0.406%	($1,061.5)	
MISCELLANEOUS **:			($1,033.1)	Base
SUBTOTAL			$153,293.8	
TOTAL REVENUES AT PRESENT RATES			$415,723.4	
INTERIM RATE INCREASE REVENUES			$17,252.2	
TOTAL REVENUE AT CURRENT EFFECTIVE RATES			$432,975.6	

** INCLUDES Schedule E Adj., Minimum Bill Adj., Apartment House Discount, and Residential TOU Adjustment.

HAWAIIAN ELECTRIC COMPANY, INC.
Docket No. 2006-0386, Test-Year 2007
SCHEDULE G - GENERAL SERVICE NON-DEMAND

ESTIMATE OF TEST YEAR REVENUES

	BILLING UNITS	UNIT PRICE	REVENUES $1000S	
		PRESENT RATES		
CUSTOMER CHARGE:	BILLS	$/month		
1 PHASE - Regular	192,429	20.00	$3,848.6	
3 PHASE - Regular	119,955	45.00	$5,398.0	
SUBTOTAL	312,384		$9,246.6	Base
ENERGY CHARGE:	(MWH)	¢/kWh		
G: Regular NON-DEMAND	371,800	11.1570	$41,481.7	
SUBTOTAL	371,800		$41,481.7	Base
ADJUSTMENTS		Rate		
FUEL OIL ADJUSTMENT:		7.299 ¢/KWH	$27,137.7	
RATE ADJUSTMENT (AES REFUND):		(0.406) (%)	($206.1)	
MISCELLANEOUS **			$31.5	Base
SUBTOTAL			$26,963.1	
TOTAL REVENUES			$77,691.4	
INTERIM RATE INCREASE REVENUES			$3,030.4	
TOTAL REVENUE AT CURRENT EFFECTIVE RATES			$80,721.8	

** INCLUDES Schedule E Adj., Service Voltage Adj., Minimum Bill Adjustments, and TOU-C Option 1 Adjustment.

HAWAIIAN ELECTRIC COMPANY, INC.
Docket No. 2006-0386, Test-Year 2007
SCHEDULE H - COMMERCIAL COOKING, HEATING, AIR CONDITIONING AND REFRIGERATION SERVICE

ESTIMATE OF TEST YEAR REVENUES

		PRESENT RATES			
	BILLING UNITS	UNIT PRICE		REVENUES $1000S	
	MWH	¢/kWh			
ENERGY CHARGE:	40,500	7.7422		$3,135.6	Base
	kW	$/kW			
DEMAND CHARGE:	74,222	9.00		$668.0	Base
CUSTOMER CHARGE:	BILLS	$/month			
1 PHASE	2,721	20.00		$54.4	
3 PHASE	6,231	45.00		$280.4	
SUBTOTAL	8,952			$334.8	Base
ADJUSTMENTS		Rate			
FUEL OIL ADJUSTMENT:		7.299	¢/KWH	$2,956.1	
RATE ADJUSTMENT (AES REFUND):		(0.406)	(%)	($16.8)	
MISCELLANEOUS **				$0.0	Base
TOTAL REVENUES				$7,077.7	
INTERIM RATE INCREASE REVENUES				$276.4	
TOTAL REVENUE AT CURRENT EFFECTIVE RATES				$7,354.1	

** INCLUDES Schedule E Adjustment.

HAWAIIAN ELECTRIC COMPANY, INC.
Docket No. 2006-0386, Test-Year 2007
Schedule J - General Service Demand

Estimate of Test Year Revenues

	PRESENT RATES			
	BILLING UNITS	UNIT PRICE	REVENUES $000s	
ENERGY CHARGE:	(MWH)	¢/kWh		
0 - 200 KWH/KW	1,198,252	8.6900	$104,128.1	
201 - 400 KWH/KW	697,152	7.5419	$52,578.5	
> 400 KWH/KW	173,396	6.5130	$11,293.3	
TOTAL	2,068,800		$167,999.9	Base
DEMAND CHARGE:	kW	$/kW		
ALL BILLING KW	6,609,417	5.75	$38,004.1	Base
CUSTOMER CHARGE:	BILLS	$/month		
1 PHASE	6,621	35.00	$231.7	
3 PHASE	74,319	60.00	$4,459.1	
SUBTOTAL	80,940		$4,690.8	Base
ADJUSTMENTS:				
MISCELLANEOUS **			($1,924.0)	Base
Fuel Oil Adjustment	¢/kWh	7.299	$151,001.7	
Rate Adjustment (AES Refund)	%	-0.406%	($847.6)	
TOTAL REVENUE			$358,924.9	
INTERIM RATE INCREASE REVENUES			$13,361.3	
TOTAL REVENUE AT CURRENT EFFECTIVE RATES			$372,286.2	

** INCLUDES Schedule E Adjustment, Service Voltage Adjustments, Power Factor Adjustment, Network Adjustment, TOU-C Option 2 Adjustment, and Rider Adjustments.

HAWAIIAN ELECTRIC COMPANY, INC.
DOCKET NO. 2006-0386 TEST-YEAR: 2007
SCHEDULE PS - LARGE POWER SECONDARY VOLTAGE SERVICE

ESTIMATE OF TEST YEAR REVENUES

		PRESENT RATES		
	BILLING UNITS	UNIT PRICE	REVENUES $1000S	
ENERGY CHARGE:	(MWH)	¢/kWh		
0 - 200 KWH/KW	366,774	7.2087	$26,439.6	
201 - 400 KWH/KW	338,271	6.4104	$21,684.5	
> 400 KWH/KW	130,812	6.1010	$7,980.8	
SUBTOTAL	835,857		$56,104.9	Base
DEMAND CHARGE:	(kW)	$/kW		
0 - 500 KW	1,034,937	10.00	$10,349.4	
501 - 1500 KW	479,646	9.50	$4,556.6	
> 1500 KW	367,120	8.50	$3,120.5	
SUBTOTAL	1,881,703		$18,026.5	Base
	BILLS	$/month		
CUSTOMER CHARGE:	2,303	320.00	$737.0	Base
ADJUSTMENTS:				
MISCELLANEOUS **			($516.2)	Base
Fuel Oil Adjustment	¢/kWh	7.299	$61,009.2	
Rate Adjustment (AES Refund)	%	-0.406%	($301.9)	
TOTAL REVENUE			$135,059.5	
INTERIM RATE INCREASE REVENUES			$5,687.9	
TOTAL REVENUE AT CURRENT EFFECTIVE RATES			$140,747.4	

** INCLUDES Schedule E Adj., Power Factor Adj., Network Adj., and Rider Adjustments.

HAWAIIAN ELECTRIC COMPANY, INC.
DOCKET NO. 2006-0386 TEST-YEAR: 2007
SCHEDULE PP - LARGE POWER PRIMARY VOLTAGE SERVICE

ESTIMATE OF TEST YEAR REVENUES

		PRESENT RATES		
	BILLING UNITS	UNIT PRICE	REVENUES $1000S	
ENERGY CHARGE:	(MWH)	¢/kWh		
0 - 200 KWH/KW	797,782	7.0715	$56,415.2	
201 - 400 KWH/KW	744,994	6.2884	$46,848.2	
> 400 KWH/KW	519,207	5.9849	$31,074.0	
SUBTOTAL	2,061,983		$134,337.4	Base
DEMAND CHARGE:	(kW)	$/kW		
0 - 500 KW	924,187	9.81	$9,066.3	
501 - 1500 KW	899,626	9.32	$8,384.5	
> 1500 KW	2,339,193	8.34	$19,508.9	
SUBTOTAL	4,163,006		$36,959.7	Base
	BILLS	$/month		
CUSTOMER CHARGE:	1,946	320.00	$622.7	Base
ADJUSTMENTS:	(MWH)	¢/kWh		
MISCELLANEOUS **			($2,633.2)	Base
Fuel Oil Adjustment	¢/kWh	7.299	$150,504.1	
Rate Adjustment (AES Refund)	%	-0.406%	($687.3)	
TOTAL REVENUE			$319,103.4	
INTERIM RATE INCREASE REVENUES			$11,917.8	
TOTAL REVENUE AT CURRENT EFFECTIVE RATES			$331,021.2	

** INCLUDES Schedule E Adj., Power Factor Adj., Secondary Metering Adj., and Rider Adjustments.

HAWAIIAN ELECTRIC COMPANY, INC.
DOCKET NO. 2006-0386 TEST-YEAR: 2007
SCHEDULE PT - LARGE POWER TRANSMISSION VOLTAGE SERVICE

ESTIMATE OF TEST-YEAR REVENUES

		PRESENT RATES		
	BILLING UNITS	UNIT PRICE	REVENUES $1000S	
ENERGY CHARGE:	(MWH)	¢/kWH		
0 - 200 KWH/KW	55,137	6.9708	$3,843.5	
201 - 400 KWH/KW	52,510	6.1989	$3,255.0	
> 400 KWH/KW	67,514	5.8997	$3,983.1	
SUBTOTAL	175,161		$11,081.6	Base
DEMAND CHARGE:	(kW)	$/kW		
0 - 500 KW	22,748	9.67	$220.0	
501 - 1500 KW	39,496	9.19	$363.0	
> 1500 KW	222,107	8.22	$1,825.7	
SUBTOTAL	284,351		$2,408.7	Base
	BILLS	$/month		
CUSTOMER CHARGE:	47	320.00	$15.0	Base
ADJUSTMENTS:				
MISCELLANEOUS **			($188.9)	Base
Fuel Oil Adjustment	¢/kWH	7.299	$12,785.0	
Rate Adjustment (AES Refund):	%	-0.406%	($54.1)	
TOTAL REVENUES			$26,047.3	
INTERIM RATE INCREASE REVENUES			$0.0	
TOTAL REVENUE AT CURRENT EFFECTIVE RATES			$26,047.3	

** INCLUDES Schedule E Adj., Power Factor Adj., Secondary Metering Adj.

HAWAIIAN ELECTRIC COMPANY, INC.
Docket No. 2006-0386, Test-Year 2007
SCHEDULE F - PUBLIC STREET LIGHTING SERVICE
HIGHWAY LIGHTING, & PARK & PLAYGROUND FLOODLIGHTING

ESTIMATE OF TEST-YEAR REVENUES

		PRESENT RATES		
	BILLING UNITS	UNIT PRICE	REVENUES $1000S	
CUSTOMER CHARGE:	Bills	$/month		
Customers	5,244	0.00	$0.0	Base
ENERGY CHARGE:	MWH	¢/kWh		
0 - 150 KWH/KW	17,464	12.7049	$2,218.8	
> 150 KWH/KW	20,336	8.7309	$1,775.5	
SUBTOTAL	37,800		$3,994.3	Base
ADJUSTMENTS:				
MISCELLANEOUS **			$14.4	Base
FUEL OIL ADJUSTMENT:		7.299 ¢/kWh	$2,759.0	
RATE ADJUSTMENT (AES REFUND):		(0.406) (%)	($16.3)	
TOTAL REVENUES			$6,751.4	
INTERIM RATE INCREASE REVENUES			$374.0	
TOTAL REVENUE AT CURRENT EFFECTIVE RATES			$7,125.4	

** INCLUDES Schedule E Adj., Minimum Bill Adj., Secondary Metering Adj.

CA-IR-192 **Ref: HECO-WP-301, page 96 (Network Service Charges).**

Please explain the perceived service quality differences associated with downtown network service and provide complete copies of all studies and other available data regarding outage frequency, outage duration, power quality differences or other service quality distinctions that explain the rationale behind charging the "Network Adjustment" to certain customers served on the network.

HECO Response:

The Company's electrical system is primarily a radial system – a one-way electrical path from generation to customer. On the radial system, should a transformer or circuit fail, a customer is without service until the transformer and/or circuit is replaced or repaired.

The service quality differences between network service and radial service relates to the level of redundant equipment on the network service. For example, a customer on the network may have a dedicated transformer and backup transformers, as well as several circuits in parallel that feed the transformers. This level of redundancy provides a higher level of service in terms of reduced outages, and duration of outage when compared to the radial system.

Attachment 1 illustrates the number of customer outages for network customers vs. radial customers for the period 2002 to 2006. The line "Total # of Customer experienced outages" represents the number of outages for the year. A customer may experience more than one outage in a given year, thus this number is higher for the radial system in relation to the "Total number of Customers". Customers on the network system experience far fewer outages due to the nature of the network system - redundant equipment and alternative electrical delivery paths. The "Network Adjustment" charge recovers the costs related to the additional equipment from the network customers.

The Company does not have studies identifying further distinctions between network and radial systems.

Iwilei Network vs. Radial Outage Comparison

		2002*	2003*	2004	2005	2006**
Network	Total # of Customers			1177	1169	1166
	Total # of Customer experienced outages	1	1	91	0	0
	Avg customer interruption duration (min)	79	55	245	0	0
Radial	Total # of Customers	281922	284460	285897	288803	291388
	Total # of Customer experienced outages	479683	468423	622135	383410	423432
	Avg customer interruption duration (min)	67.85	57.57	100.64	83.28	106.56

* Network customer count not available for 2002-2003
** Island wide outage on 10/15/2006 affected all HECO customers and has not been included

Source: Engineering T&D

CA-IR-193 **Ref: T-3, page 4, Response to CA-IR-50 (Rider Calculations).**

Please explain whether or not HECO intends to update the rate case input values to reflect changes in rider participation for the test period and, if so, provide supporting calculations and documentation for each such change at this time so the CA has an opportunity to review and respond to same.

HECO Response:

The Company intends to incorporate changes to rider participation identified in the instant IR response, and changes identified in CA-IR-50 as part of an update to test year revenues at present rates.

The Company provides the following adjustments to rider calculations contained in Attachment 1:

1) HECO-WP-301, page 113 of 140, Schedule PP. The revised revenue adjustment for Rider Mb PP4 identified in CA-IR-50 is ($-604,400). Revenue impact at present rates is (-$151,100). See Attachment 1, page 3.
2) HECO-WP-301, page 100 of 140, Schedule PS. Rider Mb PS3 is currently a Schedule J account resulting in a transfer from Schedule PS to Schedule J (referenced as Rider Mb J14). The revised revenue adjustment for Rider Mb PS3 is $0. The revenue impact for Schedule PS at present rates as revised is ($5,200). See Attachment 1, page 2.
3) HECO-WP-301, page 49 of 140, Schedule J.
   a) Rider Mb J12: Identified in CA-IR-50. The revised revenue impact at present rates is (-$1,100). See Attachment 1, page 1.
   b) Rider Mb J13: New rider customer effective 04/06/06. The revised revenue impact at present rates is (-$1,900). See Attachment 1, page 1.

c) Rider Mb J14: Formerly Rider Mb PS3 transferred rates schedules. The revised revenue impact at present rates is (-$5,100). See Attachment 1, page 1.

d) Rider T J1: Inadvertently excluded from Rider T summation formula and revised for corrected Rider kWb. The revised revenue impact at present rates is (-$44,200). See Attachment 1, page 1.

e) Rider T J2: Inadvertently excluded from Rider T summation formula and revised for corrected Rider kWb. The revised revenue impact at present rates is (-$600). See Attachment 1, page 1.

f) Rider T J4: Revised for corrected Rider kWb. The revised revenue adjustment at present rates is (-$12,700). The revised revenue impact at present rates is (-$100). See Attachment 1, page 1.

g) Rider T J5: Revised for corrected Rider kWb. The revised revenue adjustment at present rates is (-$18,300). The revised revenue impact at present rates is (-$14,400). See Attachment 1, page 1.

h) Rider T J6: Revised for corrected Rider kWb. The revised revenue adjustment at present rates is (-$5,100). The revised revenue impact at present rates is (-$900). See Attachment 1, page 1.

i) Rider T J21: Ceased rider billing effective 02/01/06. The revised revenue adjustment at present rates is ($0). The revised revenue impact at present rates is ($600). See Attachment 1, page 1.

HAWAIIAN ELECTRIC COMPANY, INC.
SCHEDULE J - General Service Demand
Docket No. 2006-0386, Test-Year 2007

SUMMARY OF TEST-YEAR REVENUES ADJUSTMENTS
FOR RIDER SERVICE AT PRESENT RATES

RIDER M(B)	HECO-WP-301 Page 49 Direct Testimony PRESENT ($1000s)	CA-IR-193 REVISED ($1000s)	Notes
Rider Mb J1	($10.6)	($10.6)	
Rider Mb J2	($12.5)	($12.5)	
Rider Mb J3	($12.4)	($12.4)	
Rider Mb J4	($18.6)	($18.6)	
Rider Mb J5	($7.1)	($7.1)	
Rider Mb J6	($3.7)	($3.7)	
Rider Mb J7	($11.2)	($11.2)	
Rider Mb J8	($30.5)	($30.5)	
Rider Mb J9	($13.5)	($13.5)	
Rider Mb J10	($7.6)	($7.6)	
Rider Mb J11	($24.8)	($24.8)	
Rider Mb J12		($1.1)	CA-IR-50
Rider Mb J13		($1.9)	New Rider effective 04-06-06
Rider Mb J14		($5.1)	Formerly Rider Mb PS3
Total Rider Mb	($152.5)	($160.6)	

RIDER I	PRESENT ($1000s)		
Rider I J1	($45.8)		
Total Rider I	($45.8)	($45.8)	

RIDER T	PRESENT ($1000s)		
Rider T J1	($61.0)	($44.2)	Corrected Rider kWb
Rider T J2	($0.5)	($0.6)	Corrected Rider kWb
Rider T J3	($3.0)	($3.0)	
Rider T J4	($12.6)	($12.7)	Corrected Rider kWb
Rider T J5	($3.9)	($18.3)	Corrected Rider kWb
Rider T J6	($4.2)	($5.1)	Corrected Rider kWb
Rider T J7	($34.8)	($34.8)	
Rider T J8	($39.4)	($39.4)	
Rider T J9	($1.4)	($1.4)	
Rider T J10	($5.2)	($5.2)	
Rider T J11	($0.9)	($0.9)	
Rider T J12	($1.2)	($1.2)	
Rider T J13	($5.9)	($5.9)	
Rider T J14	($4.7)	($4.7)	
Rider T J15	($10.2)	($10.2)	
Rider T J16	($48.8)	($48.8)	
Rider T J17	($32.7)	($32.7)	
Rider T J18	($26.0)	($26.0)	
Rider T J19	($25.9)	($25.9)	
Rider T J20	($1.3)	($1.3)	
Rider T J21	($0.6)	$0.0	Removed 02-01-06
Rider T J22	($3.4)	($3.4)	
Rider T J23	($1.8)	($1.8)	
Rider T J24	($23.6)	($23.6)	
Rider T J25	($46.9)	($46.9)	
TOTAL	($338.4)	($398.0)	Total in direct excluded Rider TJ1 and TJ2

MULTIPLE RIDERS	PRESENT ($1000s)	
Rider MbI J1	($247.5)	
TOTAL	($247.5)	($247.5)

SCHEDULE U	PRESENT ($1000s)	
Sch U J1	($99.9)	
Sch U J2	($32.2)	
Sch U J3	($68.7)	
Sch U J4	($124.6)	
TOTAL	($325.4)	($325.4)

Total Rider Adjustment	($1,109.6)	($1,177.3)
Difference		($67.7)

HAWAIIAN ELECTRIC COMPANY, INC.
SCHEDULE PS - LARGE POWER SECONDARY VOLTAGE SERVICE
DOCKET NO. 2006-0386 TEST-YEAR: 2007

SUMMARY OF TEST-YEAR REVENUES ADJUSTMENTS
FOR RIDER SERVICE AT PRESENT RATES

RIDER M(B)	HECO-WP-301 Page 100 Direct Testimony PRESENT ($1000s)	CA-IR-193 REVISED ($1000s)	Notes
Rider Mb PS1	($1.7)	($1.7)	
Rider Mb PS2	($16.2)	($16.2)	
Rider Mb PS3	($5.2)	$0.0	Changed Rate Schedules. See Sch J Riber Mb J14
Rider Mb PS4	($25.3)	($25.3)	
TOTAL	($48.4)	($43.2)	

RIDER I	PRESENT ($1000s)	
TOTAL	$0.0	$0.0

RIDER T	PRESENT ($1000s)	
Rider T PS1	($1.7)	($1.7)
TOTAL	($1.7)	($1.7)

RULE 4 CHP CUSTOMERS	PRESENT ($1000s)	
TOTAL	$0.0	$0.0

Total Rider Adjustment	($50.1)	($44.9)
Difference		$5.2

HAWAIIAN ELECTRIC COMPANY, INC.
SCHEDULE PP - LARGE POWER PRIMARY VOLTAGE SERVICE
BASED ON DOCKET NO. 2006-0386 TEST-YEAR: 2007

SUMMARY OF TEST-YEAR REVENUES ADJUSTMENTS
FOR RIDER SERVICE

RIDER M(B)	HECO-WP-301 Page 113 Direct Testimony PRESENT ($1000s)	CA-IR-193 REVISED ($1000s)	Notes
Rider Mb PP1	($13.6)	($13.6)	
Rider Mb PP2	($0.4)	($0.4)	
Rider Mb PP3	($3.5)	($3.5)	
Rider Mb PP4	($453.3)	($604.4)	CA-IR-50
Rider Mb PP5	($66.0)	($66.0)	
Rider Mb PP6	($35.1)	($35.1)	
Rider Mb PP7	($92.9)	($92.9)	
Rider Mb PP8	($93.0)	($93.0)	
TOTAL	($757.8)	($908.9)	

RIDER I	PRESENT ($1000s)		
Rider I PP1	($31.7)	($31.7)	
Rider I PP2	($81.2)	($81.2)	
TOTAL	($112.9)	($112.9)	

MULTIPLE RIDERS	PRESENT ($1000s)		
RiderMult PP1	($1.3)	($1.3)	
RiderMult PP2	($71.5)	($71.5)	
TOTAL	($72.8)	($72.8)	
Total Rider Adjustment	(943.5)	(1,094.6)	
Difference		(151.1)	

Hawaiian Electric Company, Inc.
Schedule J - General Service Demand
Docket No. 2006-0386, Test-Year 2007

Rider Mb2 J13

	Billing Units @ Present Rates		Billing Units @ Proposed Rates		Revenues @ Present Rates		Revenues @ Proposed Rates	
	Sch. J	Rider M(b)	Sch. J	Rider M(b)	Sch. J	Rider M(b)	Sch. J	Rider M(b)
Billing Load Per Month:								
Curtailable Load		34.9		34.9				
Billing kW	93.7	79.7	94.3	80.3				
kWh Per Month	38,920	38,920	38,920	38,920				
On-Peak kWh		0		0				
Off-Peak kWh		0		0				
Power Factor	85	85	85	85				
Energy Charge:								
0 - 200 kWh/kW	18,740	15,940	18,860	16,060	$1,629	$1,385	$2,969	$2,528
201 - 400 kWh/kW	18,740	15,940	18,860	16,060	$1,413	$1,202	$2,752	$2,344
>400 kWh/kW	1,440	7,040	1,200	6,800	$94	$459	$163	$922
Subtotal	38,920	38,920	38,920	38,920	$3,136	$3,046	$5,884	$5,794
On-Peak Surcharge		0		0		$0		$0
Off-Peak Credit		0		0		$0		$0
Rider T Energy Charge Adjustment		0		0		$0		$0
Demand Charge:								
Total kWb	93.7	79.7	94.3	80.3	$539	$458	$1,132	$964
Customer Charge					$60	$60	$70	$70
Time-of-Day Metering Charge						$10		$10
Primary Voltage Service Discount					$0	$0	$0	$0
Power Factor Adjustment					$0	$0	$0	$0
Total Base Revenue Per Month					$3,735	$3,574	$7,086	$6,838
Fuel Oil Adjustment					$0	$0	$0	$0
Rate Adjustment (AES Refund)					$0	$0	$0	$0
IRP Adjustment					$0	$0	$0	$0
DSM Adjustment					$0	$0	$0	$0
Total Revenue Per Month					$3,735	$3,574	$7,086	$6,838
Total Revenue Per Year ($000s)					$44.8	$42.9	$85.0	$82.1
Rider Adjustment ($000s/Yr)						($1.9)		($2.9)

Hawaiian Electric Company, Inc.
Schedule J - General Service Demand
Docket No. 2006-0386, Test-Year 2007

Rider Mb J14

	Billing Units @ Present Rates		Billing Units @ Proposed Rates		Revenues @ Present Rates		Revenues @ Proposed Rates	
	Sch. J	Rider M(b)	Sch. J	Rider M(b)	Sch. J	Rider M(b)	Sch. J	Rider M(b)
Billing Load Per Month:								
Curtailable Load		47.6		47.6				
Billing kW	861.1	825.4	877.2	841.5				
kWh Per Month	400,480	400,480	400,480	400,480				
On-Peak kWh		0		0				
Off-Peak kWh		0		0				
Power Factor	81	81	81	81				
Energy Charge:								
0 - 200 kWh/kW	172,220	165,080	175,440	168,300	$14,966	$14,345	$27,616	$26,492
201 - 400 kWh/kW	172,220	165,080	175,440	168,300	$12,989	$12,450	$25,602	$24,560
>400 kWh/kW	56,040	70,320	49,600	63,880	$3,650	$4,580	$6,728	$8,665
Subtotal	400,480	400,480	400,480	400,480	$31,605	$31,375	$59,946	$59,717
On-Peak Surcharge		0		0		$0		$0
Off-Peak Credit		0		0		$0		$0
Rider T Energy Charge Adjustment		0		0		$0		$0
Demand Charge:								
Total kWb	861.1	825.4	877.2	841.5	$4,951	$4,746	$10,526	$10,098
Customer Charge					$60	$60	$70	$70
Time-of-Day Metering Charge						$10		$10
Primary Voltage Service Discount					$0	$0	$0	$0
Power Factor Adjustment					$146	$144	$282	$279
Total Base Revenue Per Month					$36,762	$36,335	$70,824	$70,174
Fuel Oil Adjustment					$0	$0	$0	$0
Rate Adjustment (AES Refund)					$0	$0	$0	$0
IRP Adjustment					$0	$0	$0	$0
DSM Adjustment					$0	$0	$0	$0
Total Revenue Per Month					$36,762	$36,335	$70,824	$70,174
Total Revenue Per Year ($000s)					$441.1	$436.0	$849.9	$842.1
Rider Adjustment ($000s/Yr)						($5.1)		($7.8)

Hawaiian Electric Company, Inc.
Schedule J - General Service Demand
Docket No. 2006-0386, Test-Year 2007

Rider T J1

	Billing Units @ Present Rates		Billing Units @ Proposed Rates		Revenues @ Present Rates		Revenues @ Proposed Rates	
	Sch. J3	Rider T	Sch. J3	Rider T	Sch. J3	Rider T	Sch. J3	Rider T
Billing Load Per Month:								
Curtailable Load								
Billing kW	5,649.1	5,367.8	6,191.1	5,946.3				
kWh Per Month	1,247,195	1,247,195	1,247,195	1,247,195				
On-Peak kWh		718,799		718,799				
Off-Peak kWh		528,396		528,396				
Power Factor	85	85	85	85				
Energy Charge:								
0 - 200 kWh/kW	1,129,820	1,073,560	1,238,220	1,189,260	$98,181	$93,292	$168,893	$162,215
201 - 400 kWh/kW	117,375	173,635	8,975	57,935	$8,852	$13,095	$1,121	$7,237
>400 kWh/kW	0	0	0	0	$0	$0	$0	$0
Subtotal	1,247,195	1,247,195	1,247,195	1,247,195	$107,033	$106,387	$170,014	$169,452
On-Peak Surcharge		718,799		718,799		$14,376		$14,376
Off-Peak Credit		528,396		528,396		($15,852)		($15,852)
Rider T Energy Charge Adjustment		1,247,195		1,247,195		($1,476)		($1,476)
Demand Charge:								
Total kWb	5,649.1	5,367.8	6,191.1	5,946.3	$32,482	$30,865	$52,624	$50,544
Customer Charge					$60	$60	$70	$70
Time-of-Day Metering Charge						$10		$10
Primary Voltage Service Discount					($2,651)	($2,608)	($4,675)	($4,620)
Power Factor Adjustment					$0	$0	$0	$0
Total Base Revenue Per Month					$136,924	$133,238	$218,033	$213,980
Fuel Oil Adjustment					$0	$0	$0	$0
Rate Adjustment (AES Refund)					$0	$0	$0	$0
IRP Adjustment					$0	$0	$0	$0
DSM Adjustment					$0	$0	$0	$0
Total Revenue Per Month					$136,924	$133,238	$218,033	$213,980
Total Revenue Per Year ($000s)					$1,643.1	$1,598.9	$2,616.4	$2,567.8
Rider Adjustment ($000s/Yr)						($44.2)		($48.6)

Hawaiian Electric Company, Inc.
Schedule J - General Service Demand
Docket No. 2006-0386, Test-Year 2007

Rider T J2

	Billing Units @ Present Rates		Billing Units @ Proposed Rates		Revenues @ Present Rates		Revenues @ Proposed Rates	
	Sch. J	Rider T	Sch. J	Rider T	Sch. J	Rider T	Sch. J	Rider T
Billing Load Per Month:								
Curtailable Load								
Billing kW	37.6	36.1	38.8	36.3				
kWh Per Month	2,440	2,440	2,440	2,440				
On-Peak kWh		573		573				
Off-Peak kWh		1,867		1,867				
Power Factor	85	85	85	85				
Energy Charge:								
0 - 200 kWh/kW	2,440	2,440	2,440	2,440	$212	$212	$333	$333
201 - 400 kWh/kW	0	0	0	0	$0	$0	$0	$0
>400 kWh/kW	0	0	0	0	$0	$0	$0	$0
Subtotal	2,440	2,440	2,440	2,440	$212	$212	$333	$333
On-Peak Surcharge		573		573		$11		$11
Off-Peak Credit		1,867		1,867		($56)		($56)
Rider T Energy Charge Adjustment		2,440		2,440		($45)		($45)
Demand Charge:								
Total kWb	37.6	36.1	38.8	36.3	$216	$208	$330	$309
Customer Charge					$60	$60	$70	$70
Time-of-Day Metering Charge						$10		$10
Primary Voltage Service Discount					$0	$0	$0	$0
Power Factor Adjustment					$0	$0	$0	$0
Total Base Revenue Per Month					$488	$445	$733	$677
Fuel Oil Adjustment					$0	$0	$0	$0
Rate Adjustment (AES Refund)					$0	$0	$0	$0
IRP Adjustment					$0	$0	$0	$0
DSM Adjustment					$0	$0	$0	$0
Total Revenue Per Month					$488	$445	$733	$677
Total Revenue Per Year ($000s)					$5.9	$5.3	$8.8	$8.1
Rider Adjustment ($000s/Yr)						($0.6)		($0.7)

Hawaiian Electric Company, Inc.
Schedule J - General Service Demand
Docket No. 2006-0386, Test-Year 2007

Rider T J4

	Billing Units @ Present Rates		Billing Units @ Proposed Rates		Revenues @ Present Rates		Revenues @ Proposed Rates	
	Sch. J	Rider T	Sch. J	Rider T	Sch. J	Rider T	Sch. J	Rider T
Billing Load Per Month:								
Curtailable Load								
Billing kW	291.4	290.1	292.0	290.4				
kWh Per Month	77,527	77,527	77,527	77,527				
On-Peak kWh		25,340		25,340				
Off-Peak kWh		52,187		52,187				
Power Factor	88	88	88	88				
Energy Charge:								
0 - 200 kWh/kW	58,280	58,020	58,400	58,080	$5,065	$5,042	$7,966	$7,922
201 - 400 kWh/kW	19,247	19,507	19,127	19,447	$1,452	$1,471	$2,389	$2,429
>400 kWh/kW	0	0	0	0	$0	$0	$0	$0
Subtotal	77,527	77,527	77,527	77,527	$6,517	$6,513	$10,355	$10,351
On-Peak Surcharge		25,340		25,340		$507		$507
Off-Peak Credit		52,187		52,187		($1,566)		($1,566)
Rider T Energy Charge Adjustment		77,527		77,527		($1,059)		($1,059)
Demand Charge:								
Total kWb	291.4	290.1	292.0	290.4	$1,676	$1,668	$2,482	$2,468
Customer Charge					$60	$60	$70	$70
Time-of-Day Metering Charge						$10		$10
Primary Voltage Service Discount					$0	$0	$0	$0
Power Factor Adjustment					($25)	($25)	($39)	($38)
Total Base Revenue Per Month					$8,228	$7,167	$12,868	$11,802
Fuel Oil Adjustment					$0	$0	$0	$0
Rate Adjustment (AES Refund)					$0	$0	$0	$0
IRP Adjustment					$0	$0	$0	$0
DSM Adjustment					$0	$0	$0	$0
Total Revenue Per Month					$8,228	$7,167	$12,868	$11,802
Total Revenue Per Year ($000s)					$98.7	$86.0	$154.4	$141.6
Rider Adjustment ($000s/Yr)						($12.7)		($12.8)

Hawaiian Electric Company, Inc.
Schedule J - General Service Demand
Docket No. 2006-0386, Test-Year 2007

Rider T J5

	Billing Units @ Present Rates		Billing Units @ Proposed Rates		Revenues @ Present Rates		Revenues @ Proposed Rates	
	Sch. J	Rider T	Sch. J	Rider T	Sch. J	Rider T	Sch. J	Rider T
Billing Load Per Month:								
Curtailable Load								
Billing kW	404.2	259.8	436.7	287.7				
kWh Per Month	107,040	107,040	107,040	107,040				
On-Peak kWh		57,580		57,580				
Off-Peak kWh		49,460		49,460				
Power Factor	84	84	84	84				
Energy Charge:								
0 - 200 kWh/kW	80,840	51,960	87,340	57,540	$7,025	$4,515	$11,913	$7,848
201 - 400 kWh/kW	26,200	51,960	19,700	49,500	$1,976	$3,919	$2,461	$6,183
>400 kWh/kW	0	3,120	0	0	$0	$203	$0	$0
Subtotal	107,040	107,040	107,040	107,040	$9,001	$8,637	$14,374	$14,031
On-Peak Surcharge		57,580		57,580		$1,152		$1,152
Off-Peak Credit		49,460		49,460		($1,484)		($1,484)
Rider T Energy Charge Adjustment		107,040		107,040		($332)		($332)
Demand Charge:								
Total kWb	404.2	259.8	436.7	287.7	$2,324	$1,494	$3,712	$2,445
Customer Charge					$60	$60	$70	$70
Time-of-Day Metering Charge						$10		$10
Primary Voltage Service Discount					$0	$0	$0	$0
Power Factor Adjustment					$11	$10	$18	$16
Total Base Revenue Per Month					$11,396	$9,879	$18,174	$16,240
Fuel Oil Adjustment					$0	$0	$0	$0
Rate Adjustment (AES Refund)					$0	$0	$0	$0
IRP Adjustment					$0	$0	$0	$0
DSM Adjustment					$0	$0	$0	$0
Total Revenue Per Month					$11,396	$9,879	$18,174	$16,240
Total Revenue Per Year ($000s)					$136.8	$118.5	$218.1	$194.9
Rider Adjustment ($000s/Yr)						($18.3)		($23.2)

Hawaiian Electric Company, Inc.
Schedule J - General Service Demand
Docket No. 2006-0386, Test-Year 2007

Rider T J6

	Billing Units @ Present Rates		Billing Units @ Proposed Rates		Revenues @ Present Rates		Revenues @ Proposed Rates	
	Sch. J	Rider T	Sch. J	Rider T	Sch. J	Rider T	Sch. J	Rider T
Billing Load Per Month:								
Curtailable Load								
Billing kW	193.9	181.0	202.7	192.4				
kWh Per Month	31,080	31,080	31,080	31,080				
On-Peak kWh		11,507		11,507				
Off-Peak kWh		19,573		19,573				
Power Factor	88	88	88	88				
Energy Charge:								
0 - 200 kWh/kW	31,080	31,080	31,080	31,080	$2,701	$2,701	$4,239	$4,239
201 - 400 kWh/kW	0	0	0	0	$0	$0	$0	$0
>400 kWh/kW	0	0	0	0	$0	$0	$0	$0
Subtotal	31,080	31,080	31,080	31,080	$2,701	$2,701	$4,239	$4,239
On-Peak Surcharge		11,507		11,507		$230		$230
Off-Peak Credit		19,573		19,573		($587)		($587)
Rider T Energy Charge Adjustment		31,080		31,080		($357)		($357)
Demand Charge:								
Total kWb	193.9	181.0	202.7	192.4	$1,115	$1,041	$1,723	$1,635
Customer Charge					$60	$60	$70	$70
Time-of-Day Metering Charge						$10		$10
Primary Voltage Service Discount					$0	$0	$0	$0
Power Factor Adjustment					($11)	($11)	($18)	($18)
Total Base Revenue Per Month					$3,865	$3,444	$6,014	$5,579
Fuel Oil Adjustment					$0	$0	$0	$0
Rate Adjustment (AES Refund)					$0	$0	$0	$0
IRP Adjustment					$0	$0	$0	$0
DSM Adjustment					$0	$0	$0	$0
Total Revenue Per Month					$3,865	$3,444	$6,014	$5,579
Total Revenue Per Year ($000s)					$46.4	$41.3	$72.2	$66.9
Rider Adjustment ($000s/Yr)						($5.1)		($5.3)

2005 Rider M, Option B Database

# of Accts	Rider Code	Schedule	avg kWh	avg Reg kWb	avg curtailable	avg M(b) KWb	calc M(b) kWb	diff calc vs avg	avg PF	avg kvarhr	avg new J kWb	avg new M(b)	
1	Rider M(b) PP4	PP3	0	57,399.0	6,120.0	52,809.0	52,809.0	0.0	98	7406000			
2	Rider M(b) J1	J	28,220	123.2	122.1	31.6	31.6	0.0	85	0	123.6	32	
3	Rider M(b) J2	J	51,267	173.8	135.9	71.9	71.9	0.0	85	0	173.7	71.8	
4	Rider M(b) J3	J3	86,200	314.4	162.8	192.3	192.3	0.0	100	0	332	209.9	
5	Rider M(b) J4	J3	90,333	409.1	253.8	218.7	218.7	0.0	65	106667	424.5	234.2	
6	Rider M(b) PS3	PS	400,480	877.2	47.6	841.5	841.5	0.0	81	286380			Trasferred to Sch J. See Line 26
7	Rider M(b) PS4	PS	345,990	1220.1	251.2	1031.7	1,031.7	0.0	76	235600			
8	Rider M(b) J12	J	37,013	186.2	16.4	173.8	173.9	-0.1	85	0	191.6	179.3	
9	Rider M(b) PS2	PS	335,567	769.0	149.0	657.0	657.2	-0.2	100	24033			
10	Rider M(b) PP1	PP3	396,133	854.0	126.0	759.0	**759.5**	-0.5	87	128000			
11	Rider M(b) J5	J	32,013	100.4	75.3	43.9	43.9	0.0	85	0	100.8	44.3	
12	Rider M(b) PP3	PP3	179,583	337.1	32.3	320.2	**312.9**	7.3	97	46750			
13	Rider M(b) J6	J	27,687	129.3	52.3	90.1	90.1	0.0	85	10400	136.0	96.8	
14	Rider M(b) J7	J4	162,200	492.0	145.2	383.0	383.1	-0.1	99	23400	530.5	421.6	
15	Rider M(b) PP8	PP3	3,254,400	5625.6	943.2	4918.2	4,918.2	0.0	99	140600			
16	Rider M(b) PP5	PP3	756,000	2360.7	737.0	1808.0	1,807.9	0.1	97	376600			
17	Rider M(b) J8	J	173,100	494.9	307.9	263.9	264.0	-0.1	88	93900	510.7	279.8	
18	Rider M(b) PP2	PP3	474,100	793.5	4.8	789.8	789.9	-0.1	98	92450			
19	Rider M(b) PS1	PS	317,600	671.4	16.2	659.2	659.2	0.0	89	160240			
20	Rider M(b) J9	J	140,960	421.9	155.3	305.5	305.4	0.1	84	89800	437.0	320.5	
21	Rider M(b) J10	J	44,973	199.7	106.0	120.2	120.2	0.0	85	0	205.0	125.5	
22	Rider M(b) PP7	PP3	1,972,800	4114.7	939.0	3410.0	3,410.4	-0.4	96	96550			
23	Rider M(b) PP6	PP3	755,800	1411.8	325.2	1167.9	1,167.9	0.0	90	367400			
24	Rider M(b) J11	J	204,300	370.5	230.3	197.8	197.8	0.0	96	60633	371.1		
25	Rider M(b) J13	J	38,920	93.7	34.9	79.7	79.7	0.0	85	4823	94.3	80.3	
26	Rider M(b) J14	J	400,480	861.1	47.6	825.4	825.4	0.0	81	286380	877.2	841.5	See Line 6. Formerly Sch PS

CA-IR-193
DOCKET NO. 2006-038
ATTACHMENT 1
PAGE 11 OF 13

Note: Lines 1 - 24 billing data previously provided in response to CA-IR-50.

Customer Name: Rider Mb J13
Account Number: 0200-5879-001
Rate: J Phase: Mult: 80
Rider: M Option: B
Max Curtailment Load 55 KW

1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17	
Billing Date	KWH	Outside of Priority Pe Off-Peak KW	Priority Peak KW	Highest Measured Demand	Normal Billing Demand	Outside of Priority Peak Off-Peak KW	Curtailed Load (7) - (4) max 55kw	eff. 11/2/05 40% X (8)	Modified Billing Demand (6) - (9)	Minimum Charge Demand	Regular Minimum Bill	Rider Minimum Bill	Regular Bill	Rider Bill	Total Savings	
03/08/06																
04/06/06	9,440	93.0	92.3	**93.0**	**93.0**	**93.0**	**0.7**	**0.3**	**92.7**	**93.0**	632.81	**643.45**	2,132.40	2,141.21	**(8.81)**	93.0
05/08/06	45,200	95.3	94.1	**95.3**	**95.3**	**95.3**	**1.2**	**0.5**	**94.8**	**95.3**	646.89	**657.53**	7,623.61	7,627.77	**(4.16)**	95.3
06/07/06	44,400	94.4	42.8	**94.4**	**94.4**	**94.4**	**51.6**	**20.6**	**73.8**	**95.3**	642.64	**653.22**	7,583.35	7,329.10	**254.25**	94.9
07/07/06	46,160	93.7	42.6	**93.7**	**93.7**	**93.7**	**51.1**	**20.4**	**73.3**	**95.3**	632.38	**642.79**	7,908.90	7,661.24	**247.66**	94.5
08/07/06	42,640	93.0	18.8	**93.0**	**93.0**	**93.0**	**55.0**	**22.0**	**71.0**	**95.3**	644.51	**655.11**	7,515.35	7,242.32	**273.03**	94.2
09/06/06	45,680	92.5	42.8	**92.5**	**92.5**	**92.5**	**49.7**	**19.9**	**72.6**	**95.3**	644.51	**655.11**	7,943.07	7,697.11	**245.96**	93.9

CA-IR-193
DOCKET NO. 2006-038
ATTACHMENT 1
PAGE 12 OF 13

Customer Name: Rider Mb J14
Account Number:
Rate: J **Mult: 240 Phase: 3**
Rider: M **Option: B**

1	2	3	4	5	6	7	8	9	10	11	12	
		Outside of Priority Peak		Priority	Highest	Normal	Higher			Modified Billing	Minimum Charge	
Billing Date	KWH	Off-Peak KW	Mid-Peak KW	Peak KW	Measured Demand	Billing Demand	of (3) or (4)	(8) - (5)	eff. 1/1/95 75% X (9)	Demand (7) - (10)	Demand	
01/05/05	259,920	687.4	702.2	645.8	**702.2**	**702.2**	**702.2**	**56.4**	**42.3**	**659.9**	**800.9**	751.6
02/02/05	318,720	804.2	849.4	806.4	**849.4**	**849.4**	**849.4**	**43.0**	**32.3**	**817.1**	**849.4**	849.4
03/04/05	335,280	840.2	894.7	771.4	**894.7**	**894.7**	**894.7**	**123.3**	**92.5**	**802.2**	**894.7**	894.7
04/05/05	362,400	798.0	908.4	772.6	**908.4**	**908.4**	**908.4**	**135.8**	**101.9**	**806.5**	**908.4**	908.4
05/04/05	372,720	856.6	879.4	859.4	**879.4**	**879.4**	**879.4**	**20.0**	**15.0**	**864.4**	**908.4**	893.9
06/03/05	431,520	863.5	884.9	860.4	**884.9**	**884.9**	**884.9**	**24.5**	**18.4**	**866.5**	**908.4**	896.7
07/05/05	439,920	840.7	866.6	835.2	**866.6**	**866.6**	**866.6**	**31.4**	**23.6**	**843.0**	**908.4**	887.5
08/03/05	456,000	823.4	853.0	842.9	**853.0**	**853.0**	**853.0**	**10.1**	**7.6**	**845.4**	**908.4**	880.7
09/02/05	438,960	809.8	842.2	785.8	**842.2**	**842.2**	**842.2**	**56.4**	**42.3**	**799.9**	**908.4**	875.3
10/04/05	490,800	869.8	907.9	872.6	**907.9**	**907.9**	**907.9**	**35.3**	**26.5**	**881.4**	**908.4**	908.2
11/03/05	460,320	812.9	884.9	871.7	**884.9**	**884.9**	**884.9**	**13.2**	**9.9**	**875.0**	**908.4**	896.7
12/05/05	439,200	835.2	859.0	837.6	**859.0**	**859.0**	**859.0**	**21.4**	**16.1**	**842.9**	**908.4**	883.7

CA-IR-193
DOCKET NO. 2006-038
ATTACHMENT 1
PAGE 13 OF 13

CA-IR-194

Ref: HECO-WP-412, page 3 and pages 16 – 19.

The referenced workpapers contain information on Rider I.

a. Please indicate what customers are associated with Rider I, and the terms and conditions of their interruptible agreement.

b. Please explain how Rider I is modeled in the production simulation model.

c. Please provide all agreements associated with Rider I, including all amendments, attachments and exhibits.

HECO Response:

a. HECO's Rider I customers are 1) Hawaii Metal Recycling Company, 2) Airco Industrial Gases ("Gaspro"), 3) US Cold Storage of Hawaii, Ltd ("Unicold"), 4) Matson Terminals, Inc. ("Matson"), and 5) Grace Pacific Corporation. The attached copies of their respective contracts describe the terms and conditions of their interruptible service:

- Attachment 1 – Hawaii Metal Recycling Company (Docket No. 6790)
- Attachment 2 – Airgas Gaspro (Docket No. 7570)
- Attachment 3 – Unicold (Docket No. 96-0467)
- Attachment 4 – Matson (Docket No. 98-0336)
- Attachment 5 – Grace Pacific Corporation (Docket No. 03-0226)

b. Rider I is modeled as a virtual thermal unit in the production simulation, with characteristics that are intended to mimic the behavior of an interruptible resource. The capacity of the resource is 5 MW, with 100% availability (zero EFOR and no planned maintenance scheduled). The dispatch fuel cost was set to zero so that no fuel costs are recorded in the

reported results; however, the replacement fuel cost is set at a high level (maximum allowed by model), so that it becomes the resource of last resort (HECO-WP-412, page 15). These characteristics result in all other available resources being dispatched to serve load first, after which Rider I will be called upon, if necessary. In the Direct Testimony production simulation, the amount of energy served by this 5 MW virtual thermal unit was small, approximately 0.5 GWh (HECO-WP-412, page 3). As a comparison, the Net System Input (HECO-403, page 1, line 5) was approximately 8,109.2 GWh.

c. See the response to part a. above.

RIDER I
INTERRUPTIBLE SERVICE CONTRACT
BETWEEN HAWAIIAN ELECTRIC COMPANY, INC. AND
HAWAII METAL RECYCLING COMPANY

This Interruptible Service Contract (Rider I) is made this 18th day of October 1989, by and between Hawaii Metal Recycling Company, a Hawaii corporation (hereinafter called "HMR") and Hawaiian Electric Company, Inc., a Hawaii corporation (hereinafter called "HECO").

This Interruptible Service Contract is applicable to a 4,160 volt 3 phase service provided to HMR by HECO at their interconnection point located at HECO's substation at HMR.

The electric power service provided by HECO to HMR shall be interrupted under the following conditions:

1. By HMR immediately upon request by HECO when its system emergency conditions dictate the necessity, or by an underfrequency relay without notice when the frequency drops below an acceptable minimum due to system conditions on the HECO electrical system;

2. By HMR when requested to do so by HECO with prior notice when in HECO's sole judgement the system may be impaired or the startup of another unit would be uneconomic. Such interruptions with notice shall not exceed 15 interruptions per year nor a total of 8 hours during any billing period. Notice shall be given by the HECO dispatcher to the HMR operator or supervisor. Such notice shall be as far in advance as possible and in no case shall it be less than 15 minutes before service is interrupted; and

3. By HMR for the period from 7:00 a.m. to 9:00 p.m. every Monday throughout the year.

HECO shall provide electric power service to HMR under and in accordance with HECO's applicable rate schedules and riders, and in accordance with and subject to HECO's effective rules and regulations, and also subject to and in accordance with any change or modification of such schedules or riders or of such rules and regulations or any part thereof made or authorized by the Hawaii Public Utilities Commission. All terms and conditions of the applicable rate schedules and riders shall apply, except where modified in this contract. HECO shall reduce the monthly billing kw demand for HMR by 40% of HMR's monthly measured maximum kw demand. HMR's entire electrical load shall be interruptible.

HECO shall not be liable to HMR for any consequential damages resulting from such curtailment or suspension of interruptible power deliveries to HMR.

HECO shall install, own and maintain the underfrequency relay and HMR shall install the relay case furnished by HECO and shall furnish, install and maintain the auxiliary relay and wiring, and connect the relays to their 4,160 volt main service entrance circuit breaker and the frequency sensing source. HMR shall make a contribution to HECO of the total cost of the underfrequency relay and its installation.

This contract shall not in any way become binding on the parties hereto unless and until the PUC has given, by appropriate Decision and Order satisfactory to both HECO and HMR, its approval of this Contract and in such approval has authorized the terms, rates and charges set forth herein.

This contract may be changed or modified in such manner only as mutually acceptable to the parties as the PUC may from time to time direct in the exercise of its jurisdiction. Any amendment or modification of this contract or any part hereof shall not be valid unless made in writing and signed by the parties.

This contract shall become effective when approved by PUC and shall terminate five years from that date, and shall continue on a month to month basis thereafter until terminated by either party. HMR, at its option, may terminate this agreement prior to termination date by giving HECO a written notice by certified mail, U.S. postage prepaid, return receipt requested, of its desire to effect an early termination and by agreeing to pay HECO an early termination charge equal to the previous six (6) months discount received by HMR under this agreement, in which event the agreement shall terminate as of the date of receipt of the notice to terminate by HECO.

In WITNESS WHEREOF, the undersigned have caused these presents to be executed as of the day and year first above written.

HAWAIIAN ELECTRIC COMPANY, INC.	HAWAII METAL RECYCLING CO.
By [signature] 10.18.89 (Date)	By [signature] 10/12/89 (Date)
Vice President (Title)	General Manager (Title)
By [signature] 10/18/89 (Date)	By ______ (Date)
Sr. Vice President (Title)	(Title)

RIDER I

INTERRUPTIBLE CONTRACT SERVICE BETWEEN HAWAIIAN ELECTRIC COMPANY, INC. AND AIRCO INDUSTRIAL GASES dba GASPRO (Division of British Oxygen Corp.)

This Interruptible Contract Service is made this 30TH day of NOVEMBER, 1992 by and between Airco Industrial Gases, a division of British Oxygen Corp. (hereinafter called "GASPRO") and Hawaiian Electric Company, Inc., a Hawaii corporation (hereinafter called "HECO").

This Interruptible Contract Service is applicable to the existing 12,470 volt, 3-phase service provided to GASPRO by HECO at their existing interconnection point located at 91-102 Kaomi Loop.

GASPRO's interruptible industrial loads shall be interrupted under the following conditions:

1. By GASPRO immediately upon request by HECO when HECO's system emergency conditions dictate the necessity, or by an underfrequency relay without notice when the frequency drops below an acceptable minimum due to system conditions on the HECO electrical system;

2. By GASPRO when requested to do so by HECO with prior notice when in HECO's sole judgement the system may be impaired or the startup of another unit would be uneconomic. Such interruptions with notice shall not exceed 15 interruptions per year nor a total of 8 hours during any billing period. Notice shall be given by the HECO dispatcher to the GASPRO plant operator or ~~power~~ plant supervisor. Such notice shall be as far in advance as possible and in no case shall it be less than 15 minutes before service is interrupted.

For purposes of this Rider I Contract, all electrical loads on the GASPRO system in excess of 250 kilowatts shall be interruptible, and for billing, HECO shall reduce GASPRO's ratcheted "outside of off-peak" Rider M billing demand by 30% of the current measured "outside of off-peak" demand in excess of 250 kilowatts. From time to time, HECO may conduct tests to verify the kilowatt demands of GASPRO's non-interruptible loads. If GASPRO's non-interruptible loads are greater or less than 250 kilowatts, HECO will advise GASPRO of its findings and, after consultation with GASPRO, adjust its future billings to reflect this new level of non-interruptible load.

If GASPRO accepts service under Rider M, Option A, any demand occurring during that rider's designated off-peak period will not be used to calculate Rider I billing demands. The reduction in billing demands permitted under Rider I shall be in addition to any reduction in billing demands under Rider M, Option B.

HECO shall not be liable to GASPRO for any consequential damages resulting from such curtailment or suspension of interruptible power deliveries to GASPRO.

HECO shall provide, own and maintain all underfrequency relays. GASPRO shall install the relay, or relays, furnished by HECO and furnish, install and maintain the auxiliary relays and wiring, and connect the relays to GASPRO's interruptible loads. GASPRO shall pay HECO for the cost of the underfrequency relays and the costs that HECO incurs in assisting GASPRO with the installation of these relays.

Electric utility service provided by HECO with this Interruptible Contract Service shall be under a regular rate schedule in HECO's tariff. This Contract shall not in any way become binding on the parties hereto unless and until the Hawaii State Public Utilities Commission (PUC) has given, by appropriate Decision and Order satisfactory to HECO and GASPRO, its approval of this Contract and in such approval has authorized the terms, rates and charges set forth herein.

The parties agree this Contract may be changed or modified in such manner only as mutually acceptable to the parties as the PUC may from time to time direct in the exercise of its jurisdiction.

This Agreement shall become effective when approved by PUC and shall terminate five years from that date. This agreement may be renewed for additional five-year terms as long as Rider I remains part of HECO's tariff. However, whenever this agreement is renewed, HECO may revise the terms of this agreement to reflect current conditions. GASPRO, at its option, may terminate this agreement prior to termination date by giving HECO written notice by certified mail, U.S. postage prepaid, return receipt requested, of its desire to effect an early termination and by agreeing to pay HECO an early termination charge equal to the previous six months discount received by GASPRO under this agreement, in which event the agreement shall terminate as of the date of receipt of the notice to terminate by HECO. In addition, GASPRO may terminate this agreement within six months of the effective date without penalty for termination.

IN WITNESS WHEREOF, the undersigned have caused these presents to be executed as of the day and year first above written.

HAWAIIAN ELECTRIC COMPANY, INC. **AIRCO INDUSTRIAL GASES dba GASPRO**

By _____ 12/16/92 _____ 11/30/92
Its Vice-President Date Its V.P. - PRODUCTION + ENGINEERING Date

By _____ 12/14/92 _____ 12/1/92
Its Date Its PRESIDENT Date

RIDER I
INTERRUPTIBLE SERVICE CONTRACT

This Interruptible Service Contract (Rider I) is made this 8th day of November 1996 by and between US COLD STORAGE OF HAWAII, LTD., a Hawaii corporation (hereinafter called "UNICOLD") and Hawaiian Electric Company, Inc., a Hawaii corporation (hereinafter called "HECO").

This Interruptible Service Contract is applicable to a 12,470 volt, 3 phase service provided to UNICOLD by HECO at their interconnection point located at 3140 Ualena Street, Honolulu, Hawaii (Account No. [redacted]

The electric power service provided by HECO to UNICOLD shall be interrupted under the following conditions:

1. By UNICOLD immediately upon request by HECO when HECO's system emergency conditions dictate the necessity, or by an underfrequency relay without notice when the frequency drops below an acceptable minimum due to system conditions on the HECO electrical system;

2. By UNICOLD when requested to do so by HECO with prior notice when in HECO's sole judgment the system may be impaired or the startup of another unit would be uneconomic. Such interruptions with notice shall not exceed 15 interruptions per year nor a total of 8 hours during any billing period. Notice shall be given by HECO's load dispatcher to UNICOLD's designated point of contact. Such notice shall be as far in advance as possible and in no case shall it be less than 15 minutes before service is interrupted. Service interruptions that are not within HECO's control such as those due to accident, storm, lightning, wind, fire, strikes, riots, war, and other similar causes, shall not be considered in determining the duration and frequency of service interruptions specified in this contract. Service will be restored by UNICOLD only after receiving approval from HECO's load dispatcher.

For billing purposes, HECO shall reduce UNICOLD's monthly billing kilowatts (kW) demand by 30% of UNICOLD's 'interruptible load". For purposes of this Rider I contract, UNICOLD's 'interruptible load" for each billing period will be defined as UNICOLD's measured maximum Kw demand in excess of its firm load of 500kW. From time to time, HECO may conduct tests to verify the kW demands of UNICOLD's firm load. If UNICOLD's firm load is determined to be higher than 500kW, HECO will advise UNICOLD of its findings and UNICOLD's new and higher firm load will be used for the subsequent 12 billing periods for purposes of determining its interruptible load. UNICOLD's new and higher firm load shall continue to be used until HECO receives a written confirmation from UNICOLD of changes in its firm load.

HECO shall provide electric power service to UNICOLD under and in accordance with HECO's applicable rate schedule and rider, and in accordance with and subject to HECO's effective rules and regulations, and also subject to and in accordance with any change or modification of such schedule or

rider, or of such rules and regulations or any part thereof, made or authorized by the Hawaii Public Utilities Commission. All terms and conditions of the applicable rate schedule and rider shall apply, except where modified in this contract. Service under this Rider I contract cannot be combined with service provided under HECO's Schedule U, Rider M and Rider T.

HECO shall not be liable to UNICOLD for any consequential damages caused by, or resulting from any curtailment or interruption of electric service under this Rider I contract.

HECO shall own and maintain the underfrequency relay and UNICOLD shall, at its expense, purchase and install the underfrequency relay and the relay case, connect the relay to the frequency sensing source, and furnish, install and maintain the auxiliary relay and wiring required to enable the underfrequency relay to control UNICOLD's interruptible load.

UNICOLD, at its expense, shall provide any protecting or switching equipment beginning at the point of delivery on UNICOLD's premises, that may be required to serve its interruptible load. Any additional protective relays provided and installed by UNICOLD in conjunction with this Rider I contract shall be approved by HECO.

HECO will install, own, and maintain a load data recorder on UNICOLD's interruptible load served under this Rider I contract. UNICOLD shall provide, at its own expense, a location suitable to HECO for the required facilities, and a dedicated telephone line or cellular phone to connect the load data recorder with HECO's communication system.

HECO may periodically conduct tests to verify the operation of the underfrequency relay and/or the ability of UNICOLD to interrupt its interruptible load upon request by HECO. Service interruptions for testing purposes shall be in addition to the frequency and duration of service interruptions specified above, and shall not exceed 4 interruptions per year and not more than 1 hour per service interruption. These tests would be scheduled at convenient date and time for both HECO and UNICOLD.

This contract shall not in any way become binding on the parties hereto unless and until the Hawaii State Public Utilities Commission (PUC) has given, by appropriate Decision and Order satisfactory to both HECO and UNICOLD, its approval of this contract and in such approval has authorized the terms, rates and charges set forth herein.

This contract may be changed or modified in such manner only as mutually acceptable to the parties as the PUC may from time to time direct in the exercise of its jurisdiction. Any amendment or modification of this contract or any part hereof shall not be valid unless made in writing and signed by the parties.

This contract shall become effective when approved by PUC and shall terminate five years from that date, and shall continue thereafter on a year-to-year basis until terminated by either party. UNICOLD, at its option, may terminate this agreement prior to the end of the initial 5-year term of contract by giving HECO a written notice by certified mail, U.S. postage prepaid, return receipt requested, of its desire to effect an early termination and by agreeing to pay HECO an early termination charge equal to

the previous 6 months discount received by UNICOLD under this Rider I contract, in which event the agreement shall terminate as of the date of receipt of the notice to terminate by HECO.

HECO may terminate service under this contract before the end of the initial 5-year term of contract and assess UNICOLD a termination charge equal to the previous 6 months discount received by UNICOLD under this contract under the following conditions:

1. Service may be terminated immediately by HECO if actions by UNICOLD, in violation of the terms of its interruptible service contract, will adversely affect service to any of HECO's other customers.

2. Service may be terminated by HECO by a 30-day written notice to UNICOLD, if UNICOLD fails to interrupt its interruptible load upon request by HECO more than once within a twelve-month period.

In WITNESS WHEREOF, the undersigned have caused these presents to be executed as of the day and year first above written.

HAWAIIAN ELECTRIC COMPANY, INC.	US COLD STORAGE OF HAWAII, LTD. (UNICOLD)
By _____	By _____
(Date) Nov 15, 1996	(Date) Nov 8, 1996
(Title)	(Title)

RIDER I
INTERRUPTIBLE CONTRACT SERVICE

This Rider I Contract is made this September, 3, 1998 by and between MATSON TERMINALS, INC., a Hawaii corporation (hereinafter called "MATSON") and HAWAIIAN ELECTRIC COMPANY, INC., a Hawaii corporation (hereinafter called "HECO".) This Rider I Contract provides Interruptible Contract Service to MATSON by HECO, in accordance with HECO's Rider I, a copy of which is attached as Attachment A.

A. Terms of Contract

1. This Rider I Contract is applicable to a 11,500 volt, 3-phase electric power service provided to MATSON by HECO at their interconnection point located at 11 Sand Island Road, Honolulu, Hawaii (Account No. [redacted]

2. MATSON's total electric power load in the above service location shall be supplied solely by HECO, and shall be interruptible under the terms of this Rider I Contract.

3. MATSON's existing or future own generation units shall be used only for emergency purposes in case of failure of the normal supply of electric energy from HECO, or in case of electric power service interruption under this Rider I Contract. MATSON's existing or future own generation units shall not be allowed to interconnect in parallel operation with HECO's system without prior approval by HECO.

4. Conditions for Service Interruption

   1) Service Interruption Without Notice

   The electric power service provided by HECO to MATSON shall be interrupted by an underfrequency relay without notice when the frequency drops below an acceptable minimum due to emergency system conditions on the HECO electrical system. Such service interruptions due to emergency system condition shall not be considered in determining the duration and frequency of service interruption with notice, specified in this contract.

   2) Service Interruption With Notice

      a) The electric power service provided by HECO to MATSON shall be interrupted by MATSON when requested to do so by HECO with prior notice when in HECO's sole judgment the system may be impaired or the startup of another unit would be uneconomic. Such interruptions with notice shall not exceed 15 interruptions per year nor a total of 8 hours during any billing period.

b) Notice shall be given by HECO's load dispatcher to MATSON's designated point of contact. Such notice shall be as far in advance as possible and in no case shall it be less than 15 minutes before service is interrupted.

c) Service interruptions that are not within HECO's control through the exercise of reasonable diligence and care, such as those caused by accident, storm, lightning, wind, fire, strikes, riots, war, and other similar causes, shall not be considered in determining the duration and frequency of service interruptions specified in this contract.

5. When electric power service is interrupted under the terms of this Rider I Contract, service will be restored by MATSON only after contacting and receiving approval from HECO's load dispatcher. Such approval will be given by HECO's load dispatcher to MATSON's point of contact. HECO will give MATSON reasonable notice as circumstances permit, when service can be restored by MATSON as soon as the requirement for service interruption under this Rider I Contract ceased. Such notice shall be given by HECO's load dispatcher to MATSON's point of contact.

6. For billing purposes, HECO shall reduce MATSON's monthly billing kilowatts (kW) demand by 30% of MATSON's interruptible load. For purposes of this Rider I Contract, MATSON's interruptible load for each billing period will be defined as MATSON's measured maximum Kw demand for such billing period. MATSON's measured maximum demand for each billing period shall be as defined in the applicable rate schedule.

7. HECO shall provide electric power service to MATSON under and in accordance with HECO's applicable rate schedule and rider, and in accordance with and subject to HECO's effective rules and regulations, and also subject to and in accordance with any change or modification of such schedule or rider, or of such rules and regulations or any part thereof, made or authorized by the Hawaii State Public Utilities Commission (PUC). All terms and conditions of the applicable rate schedule and rider shall apply, except where modified in this Rider I Contract. Electric power service under this Rider I Contract cannot be combined with electric power service provided under HECO's Schedule U, Rider M, and Rider T.

8. HECO shall not be liable to MATSON for any consequential damages caused by, or resulting from any curtailment or interruption of electric power service under this Rider I Contract.

9. MATSON shall, at its expense, purchase and install the underfrequency relay, relay case and auxiliary relay, connect the underfrequency relay to the frequency sensing source, and shall maintain the auxiliary relay and wiring required to enable the underfrequency relay to control MATSON's interruptible load. Matson should deed to HECO the underfrequency relay and maintain the underfrequency relay, test it, and set the frequency and time delay settings before MATSON installs the relay.

10. MATSON, at its expense, shall provide any protecting or switching equipment beginning at the point of delivery on MATSON's premises, that may be required to serve its interruptible load.

Any additional protective relays provided and installed by MATSON in conjunction with this Rider I Contract shall be approved by HECO.

11. HECO will install, own, and maintain a load data recorder on MATSON's interruptible load served under this Rider I Contract. MATSON shall provide, at its own expense, a location suitable to HECO for the required facilities, and a dedicated telephone line or cellular phone to connect the load data recorder with HECO's communication system. MATSON shall pay the monthly cost of the telephone line.

12. HECO may periodically conduct tests to verify the operation of the underfrequency relay and/or the ability of MATSON to interrupt its interruptible load upon request by HECO. Service interruptions for testing purposes shall be in addition to the frequency and duration of service interruptions specified above, and shall not exceed four (4) interruptions per year and not more than one (1) hour per service interruption. These tests would be scheduled at convenient date and time for both HECO and MATSON.

13. HECO may, from time to time, change the frequency and time delay settings of the underfrequency relay in order to better coordinate with the requirements of the electrical grid. When such changes are required, MATSON shall be notified in advance before such changes are made by HECO. Such notice shall be as far in advance as possible, and in no case will it be less than one (1) day, and shall be made in writing or by phone, by HECO's Account Manager to MATSON's point of contact.

14. This Rider I Contract shall become effective when approved by the PUC, and shall terminate five years from that date. This Rider I Contract may continue after the initial 5-year term on a year-to-year basis until terminated by either party through a 30-day written notice. This Rider I Contract may be changed or modified in such manner only as mutually acceptable to the parties as the PUC may, from time to time, direct in the exercise of its jurisdiction. Any amendment or modification of this Rider I Contract or any part hereof shall not be valid unless made in writing and signed by the parties.

15. MATSON, at its option, may terminate this Rider I Contract prior to the end of the initial 5-year term of contract by giving HECO a written notice by certified mail, U.S. postage prepaid, return receipt requested, of its desire to effect an early termination. In such event, MATSON shall pay HECO an early termination charge equal to the previous 6 months discount received by MATSON under this Rider I Contract, provided that this penalty shall not be accessible if MATSON has terminated this Rider I due to a material breach by HECO. This Rider I Contract shall terminate as of the date of receipt by HECO, of the notice to terminate from MATSON and its agreement to pay HECO the above termination charge. Upon termination of this Rider I Contract, MATSON will received electric power service from HECO under the applicable rate schedule and rider and in accordance with HECO's rules and regulations and any changes thereof approved by the PUC.

16. HECO may terminate service under this Rider I Contract before the end of the initial 5-year term of contract and assess MATSON a termination charge equal to the previous 6 months discount received by MATSON under this Rider I Contract under the following conditions:

1) Service may be terminated immediately by HECO if actions by MATSON, in violation of any of the terms of this Rider I Contract, will adversely affect service to any of HECO's other customers, or will adversely impact the cost of providing service to any of HECO's other customers.

2) Service may be terminated by HECO by a 30-day written notice to MATSON, if MATSON fails to interrupt its interruptible load upon request by HECO more than once within a twelve-month period, or if MATSON restores its service during service interruption under this Rider I Contract without prior approval from HECO to restore service, more than once within a twelve-month period.

In WITNESS WHEREOF, the undersigned have caused these presents to be executed as of the day and year first above written.

HAWAIIAN ELECTRIC COMPANY, INC. (HECO)	MATSON TERMINALS INC. (MATSON)
By [signature] 9/3/98 Richard L. O'Connell (Date)	By [signature] / 9-2-98 (Date)
Vice-President, Customer Operations (Title)	Vice President (Title)

RIDER I
INTERRUPTIBLE CONTRACT SERVICE

This Rider I Contract is made this April 8th, 2003 by and between Grace Pacific Corporation, a Hawaii corporation (hereinafter called "Grace Pacific Corporation") and HAWAIIAN ELECTRIC COMPANY, INC., a Hawaii corporation (hereinafter called "HECO".) This Rider I Contract provides Interruptible Contract Service to Grace Pacific Corporation by HECO, in accordance with HECO's Rider I, a copy of which is attached as Attachment A.

A. Terms of Contract

1. This Rider I Contract is applicable to a 12,470 volt, 3-phase electric power service provided to Grace Pacific Corporation by HECO at their interconnection point located at 91-920 Farrington Hwy., Ewa Beach, Hawaii (Account [redacted]

2. Grace Pacific Corporation's total electric power load in the above service location shall be supplied solely by HECO, and shall be interruptible under the terms of this Rider I Contract.

3. Grace Pacific Corporation's existing or future own generation units shall be used only for emergency purposes in case of failure of the normal supply of electric energy from HECO, or in case of electric power service interruption under this Rider I Contract. Grace Pacific Corporation's existing or future own generation units shall not be allowed to interconnect in parallel operation with HECO's system without prior approval by HECO.

4. Conditions for Service Interruption

   1) Service Interruption Without Notice

   The electric power service provided by HECO to Grace Pacific Corporation shall be interrupted by an underfrequency relay without notice when the frequency drops below an acceptable minimum due to emergency system conditions on the HECO electrical system. Such service interruptions due to emergency system condition shall not be considered in determining the duration and frequency of service interruption with notice, specified in this contract.

   2) Service Interruption With Notice

      a) The electric power service provided by HECO to Grace Pacific Corporation shall be interrupted by Grace Pacific Corporation when requested to do so by HECO with prior notice when in HECO's sole judgment the system may be impaired or the startup of another unit would be uneconomic. Such interruptions with notice

shall not exceed 15 interruptions per year nor a total of 8 hours during any billing period.

b) Notice shall be given by HECO's load dispatcher to Grace Pacific Corporation's designated point of contact. Such notice shall be as far in advance as possible and in no case shall it be less than 15 minutes before service is interrupted.

c) Service interruptions that are not within HECO's control through the exercise of reasonable diligence and care, such as those caused by accident, storm, lightning, wind, fire, strikes, riots, terrorism, war, and other similar causes, shall not be considered in determining the duration and frequency of service interruptions specified in this contract.

5. When electric power service is interrupted under the terms of this Rider I Contract, service will be restored by Grace Pacific Corporation only after contacting and receiving approval from HECO's load dispatcher. HECO's load dispatcher will give such approval to Grace Pacific Corporation's point of contact. HECO will give Grace Pacific Corporation reasonable notice as circumstances permit, when service can be restored by Grace Pacific Corporation as soon as the requirement for service interruption under this Rider I Contract ceased. Such notice shall be given by HECO's load dispatcher to Grace Pacific Corporation's point of contact.

6. For billing purposes, HECO shall reduce Grace Pacific Corporation's monthly billing kilowatts (kW) demand by 30% of Grace Pacific Corporation's interruptible load. For purposes of this Rider I Contract, Grace Pacific Corporation's interruptible load for each billing period will be defined as Grace Pacific Corporation's measured maximum Kw demand for such billing period. Grace Pacific Corporation's measured maximum demand for each billing period shall be as defined in the applicable rate schedule.

7. HECO shall provide electric power service to Grace Pacific Corporation under and in accordance with HECO's applicable rate schedule and rider, and in accordance with and subject to HECO's effective rules and regulations, and also subject to and in accordance with any change or modification of such schedule or rider, or of such rules and regulations or any part thereof, made or authorized by the Hawaii State Public Utilities Commission (PUC). All terms and conditions of the applicable rate schedule and rider shall apply, except where modified in this Rider I Contract. Electric power service under this Rider I Contract cannot be combined with electric power service provided under HECO's Schedule U, Rider M, and Rider T.

8. HECO shall not be liable to Grace Pacific Corporation for any compensatory or consequential damages caused by, or resulting from any curtailment or interruption of electric power service under this Rider I Contract, and shall release and indemnify HECO from any such damages or claims.

9. HECO shall own and maintain the underfrequency relay, and Grace Pacific Corporation shall, at its expense, purchase and install the underfrequency relay and the relay case, connect the relay to the frequency sensing source, and furnish, install and maintain the auxiliary relay and wiring

required to enable the underfrequency relay to control Grace Pacific Corporation's interruptible load. HECO shall test the underfrequency relay and set the frequency and time delay settings before Grace Pacific Corporation installs the relay.

10. Grace Pacific Corporation, at its expense, shall provide any protecting or switching equipment beginning at the point of delivery on Grace Pacific Corporation's premises, that may be required to serve its interruptible load. Any additional protective relays provided and installed by Grace Pacific Corporation in conjunction with this Rider I Contract shall be approved by HECO.

11. HECO will install, own, and maintain a load data recorder on Grace Pacific Corporation's interruptible load served under this Rider I Contract. Grace Pacific Corporation shall provide, at its own expense, a location suitable to HECO for the required facilities, and a dedicated telephone line or cellular phone to connect the load data recorder with HECO's communication system. Grace Pacific Corporation shall pay the monthly cost of the telephone line.

12. HECO may periodically conduct tests to verify the operation of the underfrequency relay and/or the ability of Grace Pacific Corporation to interrupt its interruptible load upon request by HECO. Service interruptions for testing purposes shall be in addition to the frequency and duration of service interruptions specified above, and shall not exceed four (4) interruptions per year and not more than one (1) hour per service interruption. These tests would be scheduled at convenient date and time for both HECO and Grace Pacific Corporation.

13. HECO may, from time to time, change the frequency and time delay settings of the underfrequency relay in order to better coordinate with the requirements of the electrical grid. When such changes are required, Grace Pacific Corporation shall be notified in advance before such changes are made by HECO. Such notice shall be as far in advance as possible, and in no case will it be less than one (1) day, and shall be made in writing or by phone, by HECO's Account Manager to Grace Pacific Corporation's point of contact.

14. This Rider I Contract shall become effective when approved by the PUC, and shall terminate five years from that date. This Rider I Contract may continue after the initial 5-year term on a year-to-year basis until terminated by either party through a 30-day written notice. This Rider I Contract may be changed or modified in such manner only as mutually acceptable to the parties as the PUC may, from time to time, direct in the exercise of its jurisdiction. Any amendment or modification of this Rider I Contract or any part hereof shall not be valid unless made in writing and signed by the parties.

15. Grace Pacific Corporation, at its option, may terminate this Rider I Contract prior to the end of the initial 5-year term of contract by giving HECO a written notice by certified mail, U.S. postage prepaid, return receipt requested, of its desire to effect an early termination. In such event, Grace Pacific Corporation shall pay HECO an early termination charge equal to the previous 6 months discount received by Grace Pacific Corporation under this Rider I Contract. This Rider I Contract shall terminate as of the date of receipt by HECO, of the notice to terminate from Grace Pacific Corporation and its agreement to pay HECO the above termination charge. Upon termination of this Rider I Contract, Grace Pacific Corporation will receive electric power service

from HECO under the applicable rate schedule and rider and in accordance with HECO's rules and regulations and any changes thereof approved by the PUC.

16. HECO may terminate service under this Rider I Contract before the end of the initial 5-year term of contract and assess Grace Pacific Corporation a termination charge equal to the previous 6 months discount received by Grace Pacific Corporation under this Rider I Contract under the following conditions:

    1) Service may be terminated immediately by HECO if actions by Grace Pacific Corporation, in violation of any of the terms of this Rider I Contract, will adversely affect service to any of HECO's other customers, or will adversely impact the cost of providing service to any of HECO's other customers.

    2) Service may be terminated by HECO by a 30-day written notice to Grace Pacific Corporation , if Grace Pacific Corporation fails to interrupt its interruptible load upon request by HECO more than once within a twelve-month period, or if Grace Pacific Corporation restores its service during service interruption under this Rider I Contract without prior approval from HECO to restore service, more than once within a twelve-month period.

In WITNESS WHEREOF, the undersigned have caused these presents to be executed as of the day and year first above written.

HAWAIIAN ELECTRIC COMPANY, INC. (HECO)	GRACE PACIFIC CORPORATION (GRACE)
By _____ / 5/2/03	By _____ / 4/11/03
Karl Stahlkopf (Date)	Robert Creps (Date)
Senior Vice President	Senior Vice-President
(Title)	(Title)

CA-IR-195

Ref: T-4, page 12, lines 24 – 25; HECO-WP-412, page 3 and page 17.

Page 12 of T-4 seems to omit Variable operation and Maintenance cost in calculating commitment and dispatch levels.

a. Please provide the Variable O&M cost for all HECO generating units.

b. If the Variable O&M cost is not included in the cost of any HECO generating unit please explain.

HECO Response:

a. The Variable Operation and Maintenance cost rates used in the test year production simulation was zero for all HECO generating units, as indicated on HECO-WP-412, page 17 (column "VOM Cost").

b. The production simulation is intended to reflect how the generating units are and will be committed and dispatched in actual operation. As noted in the response to part a. above, the variable O&M costs used in the production simulation are zero for all HECO generating units. This reflects how the generating units actually are and will be committed and dispatched.

In actual operation, variable O&M costs are not used in the commitment and dispatch of the HECO generating units. This is because the variable O&M costs are very small relative to energy production costs related to fuel only. For example, in the Stipulation to Resolve Proceeding, filed on March 4, 1994, in Docket No. 7310 (the "Stipulation"), HECO indicated in Exhibit J, page 1, that the avoided O&M rates (i.e., variable O&M costs) were 0.020¢/kWh for its steam units. In 1994, the average cost of LSFO was about $17 per barrel. At this LSFO price, the average cost of energy production from Kahe Unit 6 (one of HECO's most efficient steam unit) was about 2.8¢/kWh at its normal top load ("NTL"), assuming an efficiency of 10,086 Btu/kWh-net at NTL and 6,200,000 Btu per barrel of

LSFO. The variable O&M value of 0.020¢/kWh would be about 0.7% of the energy production cost based on fuel costs alone. This percentage would be even lower for HECO's other, less efficient steam units. This small difference would not affect the commitment order or dispatch of the units, especially since the same variable O&M cost would be used for all HECO units.

In HECO's submission of September 9, 2005 in the updated Stipulation, the variable O&M cost was updated to 0.025¢/kWh in 2005 dollars based on the application of the Consumer Price Index – Urban for Honolulu in accordance with Exhibit M of the Stipulation. The average LSFO price in 2005 was about $51 per barrel. At this LSFO price, the average cost of energy production from Kahe Unit 6 was about 8.3¢/kWh at its normal NTL. The variable O&M value of 0.025¢/kWh would be about 0.3% of the energy production cost based on fuel costs alone. This percentage would be even lower for HECO's other, less efficient steam units. Therefore, the variable O&M costs are currently an even smaller percentage of energy production costs based on fuel alone.

CA-IR-196

Ref: HECO-WP-412, page 3.

Please explain and provide all calculations for how the Operating Cost ($/MWh) is calculated for each HECO generating unit and purchased power unit on the referenced workpaper.

HECO Response:

The referenced Operating Cost ($/MWh) shown on HECO-WP-412, page 3 is a figure calculated by P-MONTH, for each unit. It would be equivalent to the Total Cost ($/MWh, found on the adjacent column) less the accumulated start-up fuel costs for the unit in the year, divided by the energy produced for the year. There are no P-MONTH reports that provide the accumulated start-up fuel costs for each unit (in order to help "trace" the P-MONTH calculation). However, it can be observed for AES, H-Power, and Kalaeloa that the reported Operating Cost ($/MWh) is equal to the reported Total Cost ($/MWh), which is consistent with the lack of start-up fuel requirements for the IPPs in P-MONTH. It should be noted that HECO does not depend on this reported value of Operating Cost ($/MWh) in the test year exhibits or workpapers.

CA-IR-197

Ref: HECO-WP-406, page 1 and HECO-WP-412, pages 18 – 19.

a. HECO-WP-406, page 1 lists the operating minimum capacity for Kahe 5 as 49.8 MW. HECO-WP-412, page 18 lists the minimum as 50.4 MW. Please identify which minimum capacity was used in the production simulation.

b. HECO-WP-406, page 1 lists the operating minimum capacity for Kahe 6 as 40.1 MW. HECO-WP-412, page 19 lists the minimum capacity as 49.8 MW. Please identify which minimum capacity was used in the production simulation.

HECO Response:

a. The minimum capacity used in the direct testimony production simulation for Kahe 5 was 50.4 MW. As indicated in the response to CA-IR-214, HECO has updated the production simulation using updated information. The minimum capacity used in the updated production simulation for Kahe 5 is 50.7 MW.

b. The minimum capacity used in the direct testimony production simulation for Kahe 6 was 49.8 MW. As indicated in the response to CA-IR-214, HECO has updated the production simulation using updated information. The minimum capacity used in the updated production simulation for Kahe 6 is 50.0 MW.

CA-IR-198

Ref: Response to CA-IR-54, Part 6.

Please indicate if any HECO generating units or power purchases are restricted to specific operating hours. (i.e., limited to 6 am to 9 pm, etc.).

HECO Response:

None of the HECO generating units or power purchases are restricted to specific operating hours. As explained in the response to CA-IR-54, Part 6, the production simulation for the HECO-sited Distributed Generation implements a restricted dispatch for modeling purposes. However, actual operation may vary from this approximation, and the HECO-sited Distributed Generation is not restricted to specific operating hours.

CA-IR-199

Ref: T-4, page 33, lines 8-9; T-4, page 35, lines 6 – 8; T-4, page 36, lines 14 – 18.

Please provide the Operations and Maintenance Agreement for the Barbers Point Tank Farm, Kahe Pipeline and Waiau Pipeline dated December 14, 2004, including all amendments, attachments and exhibits.

HECO Response:

See pages 2 to 40 for a copy of the "Operations and Maintenance Agreement" by and between ChevronTexaco Products Company, a Division of Chevron U.S.A., Inc. and Hawaiian Electric Company, Inc. The information is confidential and is being provided pursuant to Protective Order No. 23378, dated April 23, 2007.

Confidential Information Deleted
Pursuant to Protective Order No. 23378.

Pages 2 to 40 contain confidential information and are being provided pursuant to Protective Order No. 23378, issued on April 23, 2007.

CA-IR-200

Ref: T-4, page 33, lines 17-18.

Please provide the Barbers Point Tank Farm Services Agreement dated December 14, 2004, including all amendments, attachments and exhibits.

HECO Response:

See pages 2 to 16 for a copy of the "Barbers Point Tank Farm Services Agreement" by and between ChevronTexaco Products Company, a Division of Chevron U.S.A., Inc. and Hawaiian Electric Company, Inc. The information is confidential and is being provided pursuant to Protective Order No. 23378, issued on April 23, 2007.

Confidential Information Deleted
Pursuant to Protective Order No. 23378.

Pages 2 to 16 contain confidential information and are being provided pursuant to Protective Order No. 23378, issued on April 23, 2007.

CA-IR-201

Ref: T-4, page 36, line 8.

Please provide the Facilities and Operations Contract between Chevron and HECO referenced in T-4, page 36, line 8, including all amendments, attachments and exhibits.

HECO Response:

See pages 2 to 69 for a copy of the Facilities and Operating Contract by and between Chevron Products Company, a Division of Chevron U.S.A. Inc. and Hawaiian Electric Company, Inc. dated November 14, 1997. The information is confidential and is being provided pursuant to Protective Order No. 23378, dated April 23, 2007. Because the Facilities and Operating Contract is voluminous, it is available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect the contract.

Confidential Information Deleted
Pursuant to Protective Order No. 23378.

Pages 2 to 69 are confidential and will be provided pursuant to Protective Order No. 23378, dated April 23, 2007. Because the Facilities and Operations contract is voluminous, it is available for inspection at HECO's Regulatory Affairs Division office, Suite 1301, Central Pacific Plaza, 220 South King Street, Honolulu, Hawaii. Please contact Dean Matsuura at 543-4622 to make arrangements to inspect the contract.

CA-IR-202

Ref: T-4, page 36, lines 1 – 19.

The referenced section of testimony indicates that HECO's cost estimate of the test year Pipeline Maintenance Expense was derived from terms set forth in the Facilities and Operations Contract and the Operations and Maintenance Agreement between Chevron and HECO.

Please provide the calculations used to adjust the Kahe Pipeline and Waiau Pipeline cost estimates to 2007 dollars.

HECO Response:

		Kahe Pipeline Non-Base Ops & Maintenance	
year	w.o. #	total actual work order	total in 2005 dollars
2003	G0008203	$382,341	$405,097
2004	G0009576	$160,131	$164,976
2005	G0011243	$290,013	$290,013
total in 2005 dollars			$860,087
annual average in 2005 dollars			$ 286,696
annual average in 2006 dollars			$ 295,503
annual average in 2007 dollars			**$ 302,115**
		assumptions/conversions:	
		GDP: Implicit Price Deflator (2000 = 100)	
		(Source: BEA, NIPA Table) 2003	106.404
		(Source: BEA, NIPA Table) 2004	109.426
		(Source: BEA, NIPA Table) 2005	112.737
		Est GDPIPD DOE/EIA STEO Oct. 2006)	
		2006	116.2
		2007	118.8

		Waiau Pipeline Non-Base Ops & Maintenance	
year	w.o. #	total actual work order	total in 2005 dollars
2005	G0011243	$125,965	$125,965
Pipeline entered service in mid-December 2004			
total in 2005 dollars			$ 125,964.6
annual average in 2006 dollars			$ 129,834
annual average in 2007 dollars			**$ 132,739**
		assumptions/conversions:	
		GDP: Implicit Price Deflator (2000 = 100)	
		(Source: BEA, NIPA Table) 2003	106.404
		(Source: BEA, NIPA Table) 2004	109.426
		(Source: BEA, NIPA Table) 2005	112.737
		Est GDPIPD DOE/EIA STEO Oct. 2006)	
		2006	116.2
		2007	118.8

CA-IR-203

Ref: T-4, page 36, line 21 – page 39, line 3.

The referenced section of testimony indicates that HECO's cost estimate of the test year Tank Farm Management Fee was derived from terms set forth in the Barbers Point Tank Farm Services Agreement with HECO and the Facilities and Operations Contract and the Operations and Maintenance Agreement between Chevron and HECO.

Please provide the calculations used to adjust the cost estimate to 2007 dollars.

HECO Response:

The Barbers Tank Farm Expense For Test Year 2007 is comprised of three categories of cost:

$ 294,903 Base Management Fee;

$ 529,244 Low Pressure Steam Expense;

$ 309,166 Non-Base Maintenance;

each computed as follows:

		Tankfield/BPTF Base Fee	
year	w.o. #	fixed portion	non-fixed in 2005 dollars
2005 Qtr1	HP001031	$ 69,468.00	$3,657
2005 Qtr2	HP001311	$ 69,468.00	$3,690
2005 Qtr3	HP001576	$ 69,468.00	$3,726
2005 Qtr4	HP001771	$ 69,468.00	$3,669
	Contract Came into effect 1st Quarter 2005, $23,156/month fixed;		
	$1,219/month subject to quarterly escalation; fee amount is before taxes		
total in 2005 dollars		$277,872	$14,742
annual average in 2005 dollars			$ 292,614
annual average in 2006 dollars			$ 281,671
annual average in 2007 dollars			$ 281,756
annual avg 2007 dollars incl rev HGET			**$ 294,903**
		assumptions/conversions:	
		GDP: Implicit Price Deflator (2000 = 100)	
	(Source: BEA, NIPA Table) 2005		112.737
		Est GDPIPD DOE/EIA STEO Oct. 2006)	
		2006	116.2
		2007	118.8

		Low Pressure Steam	
year	w.o. #	total actual work order	total in 2005 dollars
2003	HP001577	$409,193	$433,548
2004	HP001772	$424,928	$437,786
2005	HP002071	$635,369	$635,369
total in 2005 dollars			$ 1,506,703.02
annual average in 2005 dollars			$ 502,234
annual average in 2006 dollars			$ 517,661
annual average in 2007 dollars			**$ 529,244**
		assumptions/conversions:	
		GDP: Implicit Price Deflator (2000 = 100)	
		(Source: BEA, NIPA Table) 2003	106.404
		(Source: BEA, NIPA Table) 2004	109.426
		(Source: BEA, NIPA Table) 2005	112.737
		Est GDPIPD DOE/EIA STEO Oct. 2006)	
		2006	116.2
		2007	118.8

		Reimbursable/variable O&M	
year	w.o. #	total actual work order	total in 2005 dollars
2003	G0008204	$0	$0
2004	G0009577	$56,121	$57,819
2005	G0011244	$362,201	$362,201
total in 2005 dollars			$ 420,019.83
annual average in 2005 dollars			$ 140,007
annual average in 2006 dollars			$ 144,308
annual average in 2007 dollars			**$ 147,537**
		Reimbursable/variable O&M - Long Term	
Tank cleaning, bottom inspection, re-			
coating and repair, if necessary			
Last done: # 131 in 1995, # 132 in 1996			
and # 133 in 1997.			
To be done: # 131 in 2007, # 132 in 2008			
and # 133 in 2009.			
Normalize on 12 year cycle			
		total project cost	**total in 2005 dollars**
1995:		$ 550,947	$674,355
1996:		$ 530,739	$637,535
1997:		$ 447,441	$528,677
total:		$ 1,529,127	
total in 2005 dollars			$ 1,840,566.22
12-year cycle annual avg in 2005 dollars			$ 153,381
12-year cycle annual avg in 2006 dollars			$ 158,092
12-year cycle annual avg in 2007 dollars			**$ 161,629**
TOTAL BPTF Variable O&M 2007			**$ 309,166**
		assumptions/conversions:	
		GDP: Implicit Price Deflator (2000 = 100)	
		(Source: BEA, NIPA Table) 1995	92.106
		(Source: BEA, NIPA Table) 1996	93.852
		(Source: BEA, NIPA Table) 1997	95.414
		(Source: BEA, NIPA Table) 2003	106.404
		(Source: BEA, NIPA Table) 2004	109.426
		(Source: BEA, NIPA Table) 2005	112.737
		Est GDPIPD DOE/EIA STEO Oct. 2006)	
		2006	116.2
		2007	118.8

CA-IR-204

Ref: T-4, page 39, line 5 – page 41, line 4.

The referenced section of testimony indicates that the total HECO fuel handling expense is applied on a prorate dollar amount basis to each of these components.

Please provide the calculations used to derive each component and the total fuel handling expense.

HECO Response:

PRORATION OF FUEL HANDLING EXPENSES						
Fuel Handling Expenses:						
Share info sys non-labor for fuel data system:					$ 23,851.00	
Fuels Division labor, non-labor and overheads:					$ 504,939.00	
Share O&M Department labor and overheads:					$ 602,003.00	
			total fuel handling		**$ 1,130,793**	
			Kahe	**Waiau**	**Other**	**Total**
Facilities Base Fee:						
Base Fee before prorata handling			$ 613,285	$ 1,526,534		$ 2,139,819
Facilities Non-Base Maintenance:						
Non-Base maintenance before prorata handling			$ 302,115	$ 132,739		$ 434,854
Tank Farm Services:						
Managent Fee, Steam, Non-Base maintenance						
before prorata handling					$ 1,133,313	$ 1,133,313
Total Fuel Facilities O&M Before Prorata Handling						**$ 3,707,986**
		Allocation by Activity Expense Amount:				
		% total expense before allocation;		**dollar amount**		
		Kahe Base Fee	16.54%	187,028.32		
		Waiau Base Fee	41.17%	465,534.11		
		Kahe Maintenance	8.15%	92,133.45		
		Waiau Maintenance	3.58%	40,480.29		
		BPTF Services	30.56%	345,616.84		
		total fuel handling by allocation		1,130,793.00		